

DRAFT FINAL

Site Closure Report

**Building 241 Former Gasoline UST Site and
Building 125 Former Heating Oil UST Site**



**Los Angeles Air Force Base
California**

Prepared For

**Air Force Center for Environmental Excellence
Technology Transfer Division
Brooks Air Force Base
San Antonio, Texas**

and

**Los Angeles Air Force Base
California**

July 1996



**PARSONS
ENGINEERING SCIENCE, INC.**

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DRAFT FINAL

SITE CLOSURE REPORT

FOR

BUILDING 241 FORMER GASOLINE UST SITE AND

BUILDING 125 FORMER HEATING OIL UST SITE

LOS ANGELES AFB, CALIFORNIA

Prepared for

Air Force Center for Environmental Excellence
Brooks Air Force Base, Texas

and

Los Angeles Air Force Base, California

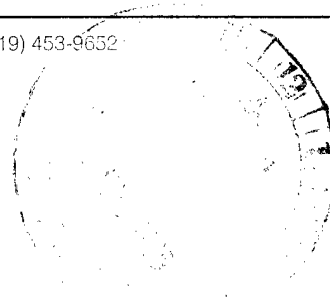
July 1996

Parsons Engineering Science, Inc.
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PARSONS ENGINEERING SCIENCE, INC.

9404 Genesee Avenue, Suite 140 • La Jolla, California 92037 • (619) 453-9650 • Fax: (619) 453-9652

July 23, 1996



Capt. Ed Marchand
AFCEE/ERT
3207 North Road Building 532
Brooks AFB, Texas 78235-5363

Subject: Draft Final Site Closure Report for the Building 241 Former Gasoline UST Site and the Building 125 Former Heating Oil UST Site, Los Angeles Air Force Base, California (Contract F41624-92-D-8036, Order No. 0017)

Dear Capt. Marchand:

Please find enclosed three copies of the Draft Final Site Closure Report for the Building 241 Former Gasoline UST Site and the Building 125 Former Heating Oil UST Site, Los Angeles Air Force Base, California prepared by Parsons Engineering Science, Inc. (Parsons ES) for the Air Force Center for Environmental Excellence (AFCEE) and Los Angeles Air Force Base (Los Angeles AFB), California. Three copies of this document have also been delivered to Mr. Darrin Lambrigger, the Los Angeles AFB point of contact and to the California Regional Water Quality Control Board Los Angeles Region (RWQCB). Any RWQCB comments will be included in a Final Site Closure Report (if necessary). As requested by Mr. Lambrigger, a copy has also been forwarded to Mr. Michael Edwards of the California Department of Toxic Substance Control. If you have any questions concerning the Site Closure Report, please call me at (619) 453-9650, or John Ratz, the Parsons ES Project Manager for the Extended Bioventing Program, at (303) 831-8100.

Sincerely,

PARSONS ENGINEERING SCIENCE, INC.

A handwritten signature in black ink, appearing to read "Larry Dudus".

Larry Dudus, R.G.
Site Manager

LAD/ajs

Enclosures

cc: Mr. Darrin Lambrigger (Los Angeles AFB)
John Ratz (Parsons ES)
File 726876-25123

PARSONS ENGINEERING SCIENCE, INC.

9404 Genesee Avenue, Suite 140 • La Jolla, California 92037 • (619) 453-9650 • Fax: (619) 453-9652

July 23, 1996

Ms. Manjulika Chakrabarti
California Regional Water Quality Control Board
Los Angeles Region
101 Centre Plaza Drive
Monterey Park, California 91754

Subject: Draft Final Site Closure Report for the Building 241 Former Gasoline UST Site and
the Building 125 Former Heating Oil UST Site, Los Angeles Air Force Base,
California (Contract F41624-92-D-8036, Order No. 0017)

Dear Ms. Chakrabarti:

Please find enclosed one copy of the Draft Final Site Closure Report for the Building 241 Former Gasoline UST Site and the Building 125 Former Heating Oil UST Site, Los Angeles Air Force Base, California prepared by Parsons Engineering Science, Inc. (Parsons ES) for the Air Force Center for Environmental Excellence (AFCEE) and Los Angeles Air Force Base (Los Angeles AFB), California. Copies of this document have also been delivered to Mr. Darrin Lambrigger, the Los Angeles AFB point of contact, Capt. Ed Marchand, the AFCEE point of contact, and to the California Department of Toxic Substance Control. Your comments will be included in a Final Site Closure Report (if necessary). If you have any questions concerning the Site Closure Report, please call me at (619) 453-9650, or John Ratz, the Parsons ES Project Manager for the Extended Bioventing Program, at (303) 831-8100.

Sincerely,

PARSONS ENGINEERING SCIENCE, INC.



Larry Dudus, R.G.
Site Manager

LAD/ajs

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July 23, 1996

Mr. Darrin Lambrigger
61 ABG/CEZV
180 Challenger Way, Bldg. 244, Suite 8
Los Angeles AFB, California 90245-4652

Subject: Draft Final Site Closure Report for the Building 241 Former Gasoline UST Site and the Building 125 Former Heating Oil UST Site, Los Angeles Air Force Base, California (Contract F41624-92-D-8036, Order No. 0017)

Dear Mr. Lambrigger:

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Sincerely,

PARSONS ENGINEERING SCIENCE, INC.



Larry Dudus, R.G.
Site Manager

LAD/ajs

Enclosures

cc: Capt. Ed Marchand (AFCEE)
John Ratz (Parsons ES)
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PARSONS ENGINEERING SCIENCE, INC.

9404 Genesee Avenue, Suite 140 • La Jolla, California 92037 • (619) 453-9650 • Fax: (619) 453-9652

May 30, 1996

Capt. Ed Marchand
AFCEE/ERT
8001 Arnold Drive
Brooks AFB, Texas 78235

Subject: Draft Site Closure Report for the Building 241 Former Gasoline UST Site and the
Building 125 Former Heating Oil UST Site, Los Angeles Air Force Base, California
(Contract F41624-92-D-8036, Order No. 0017)

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Appendix A, the Final Sampling and Analysis Plan, and Appendix C, Laboratory Analytical Results, have not been included in this draft. They will be included in the draft final. If you have any questions concerning the Site Closure Report, please call me at (619) 453-9650, or John Ratz, the Parsons ES Project Manager for the Extended Bioventing Program, at (303) 831-8100.

Sincerely,

PARSONS ENGINEERING SCIENCE, INC.



Larry Dudus, R.G.
Site Manager

LAD/ajs

Enclosures

cc: Mr. Darrin Lambrigger (Los Angeles AFB)
John Ratz (Parsons ES)
File 726876-25123



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May 30, 1996

Mr. Darrin Lambrigger
61 ABG/CEZV
180 Challenger Way, Bldg. 244, Suite 8
Los Angeles AFB, California 90245-4652

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Larry Dudus, R.G.
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DRAFT

SITE CLOSURE REPORT
FOR
BUILDING 241 FORMER GASOLINE UST SITE AND
BUILDING 125 FORMER HEATING OIL UST SITE
LOS ANGELES AFB, CALIFORNIA

Prepared for

Air Force Center for Environmental Excellence
Brooks Air Force Base, Texas

and

Los Angeles Air Force Base, California

June 1996

Parsons Engineering Science, Inc.
9404 Genesee Ave., Suite 140
La Jolla, California 92037

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B	Borehole Logs
C	Laboratory Analytical Results

SECTION 1

INTRODUCTION

1.1 OBJECTIVES AND SCOPE

During the past two years, Los Angeles Air Force Base (AFB) has participated in the Air Force Bioventing Pilot Test Initiative Project sponsored by the Air Force Center for Environmental Excellence (AFCEE) at Brooks AFB, Texas. The project included conducting more than 135 *in situ* bioventing pilot tests at 48 Air Force installations throughout the country. These year-long tests were designed to collect data on the effectiveness of bioventing for the remediation of soil contaminated with fuel hydrocarbons (i.e., JP-4 jet fuel, diesel fuel, gasoline, heating oil, etc.). The tests were not part of a remedial action plan designed to reduce soil contamination to below regulatory soil cleanup standards. However, based on the success of these year-long tests, several sites were selected by AFCEE for additional sampling to help support site closure. Two such sites are the Building 241 Former Gasoline Underground Storage Tank (UST) Site and the Building 125 Former Heating Oil UST Site.

One-year-long bioventing pilot tests have recently been concluded at three Los Angeles AFB sites, including the Building 241 Former Heating Oil UST Site and the Building 125 Former Heating Oil UST Site. Located within the currently operating Building 241 Former Heating Oil UST Site bioventing system's zone of influence is the Building 241 Former Gasoline UST Site. This site closure report has been prepared to support a closure recommendation for the Building 241 Former Gasoline UST Site and the Building 125 Former Heating Oil UST Site. This recommendation is based on analytical results obtained through implementation of a site-specific closure sampling and analysis plan (SAP) (Parsons Engineering Science, Inc. (Parsons ES), 1995). The closure SAP was reviewed and approved by California Regional Water Quality Control Board, Los Angeles Region (RWQCB) staff prior to implementation. A copy of the SAP is provided as Appendix A. The closure SAP presented a plan for confirmatory soil sampling and analysis to document the effectiveness of soil remediation at these sites and to demonstrate compliance with regulatory requirements for closure. Soil screening levels (SSLs) for fuel-hydrocarbon-contaminated soils have been established by the RWQCB. Attainment of these levels signifies that remediation has been sufficient to protect underlying groundwater and that site closure may be requested. If remaining hydrocarbons are above state SSLs, an option to comply with closure requirements is to demonstrate that soil contamination poses no risk to site groundwater quality.

Confirmation soil sampling was conducted approximately 12 months after completion of the one-year *in situ* bioventing pilot test for the project sites. Soil sampling at the Building 241 Former Gasoline UST Site entailed drilling and sampling one borehole through the former tank bed. All laboratory test results for the Building 241 Former Gasoline UST Site were nondetect. These results support closure of this site.

Unlike the Building 241 Former Gasoline UST Site, the Building 125 Former Heating Oil UST Site had not been characterized before bioventing system installation. Therefore, in addition to one borehole installed through the former tank bed, the RWQCB requested three boreholes be located around the tank perimeter to confirm soil contamination has not migrated beyond the former tank bed. Twenty-five soil samples from four boreholes were analyzed. All analytical results for benzene, toluene, ethylbenzene, and total xylenes (BTEX) were below detection limits. Three soil samples had total extractable petroleum hydrocarbons (TEPH) above RWQCB (1995) SSLs. However, because of the depth of the small amount of impacted soil, the relatively low concentrations of TEPH, and the site geologic conditions, the remaining hydrocarbon-contaminated soil poses little risk to human health or site groundwater. Therefore, a risk-based closure will be sought for this site.

1.2 REPORT ORGANIZATION

This site closure report consists of five sections, including this introduction, and three appendices. Section 2 includes site descriptions, history, and summary of previous investigations and remediation activities. Section 3 is a description of closure sampling activities that were conducted at the sites. Section 4 contains a summary of closure sampling analytical results and recommendations for site closure. References used for preparation of this report are provided in Section 5. Appendix A presents a copy of the closure SAP. Appendix B provides copies of the site borehole logs. Appendix C presents laboratory analytical data for site environmental and quality assurance (QA) samples.

SECTION 2

SITE DESCRIPTION AND HISTORY

2.1 SITE DESCRIPTION

Los Angeles AFB is located in El Segundo, California, approximately two miles south of Los Angeles International Airport. Los Angeles AFB lies north and south of El Segundo Boulevard, between Douglas Avenue to the west and the San Diego Freeway (405) to the east (Figure 2.1). In the immediate vicinity are other defense and aerospace industries, light to medium manufacturing/industrial facilities, and single-family homes to the south of the Base.

Los Angeles AFB is the Space and Missile System Center for the U.S. Air Force. Most of the facilities are office buildings, with some warehouse and maintenance shops, and a Base exchange center. The Base has no runway, aircraft, or related facilities. However, prior to becoming an Air Force base in the 1950s, defense contractors operated jet engine test facilities at the site.

2.1.1 Building 241 Former Gasoline UST Site

Building 241, which houses a boiler facility, is currently active. The area surrounding the building is paved with concrete and asphalt. The site location is shown on Figure 2.1. The former 150-gallon gasoline UST is thought to have been installed in the mid-1950s. The tank was located immediately south of Building 241. The site layout, including the nearby former heating oil UST bioventing site, is shown on Figure 2.2. The UST was removed in August 1990 by TetraTech, Inc. (Mittelhauser Corporation, 1992) under Los Angeles County Department of Public Works (LACDPW) Hazardous Materials Division Closure Permit No. 7969, File No. I-10138-2C/15164-2N. The tank had visible signs of corrosion, and the fill pipe was disconnected from the tank. Tank-bed soil samples collected during UST removal operations indicated the presence of total recoverable petroleum hydrocarbon (TRPH) and BTEX contamination. Analytical results are described in Subsection 2.4. No additional excavation or investigation work was performed at that time. The excavation was backfilled with soil removed during the excavation, covered to grade with clean soil, and repaved with concrete. This site is currently being managed under the Air Force Installation Restoration Program.

2.1.2 Building 125 Former Heating Oil UST Site

Building 125 is a restricted (security clearance required) office facility (Figure 2.1). The former 3,400-gallon heating oil UST was located under the asphalt parking lot

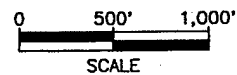
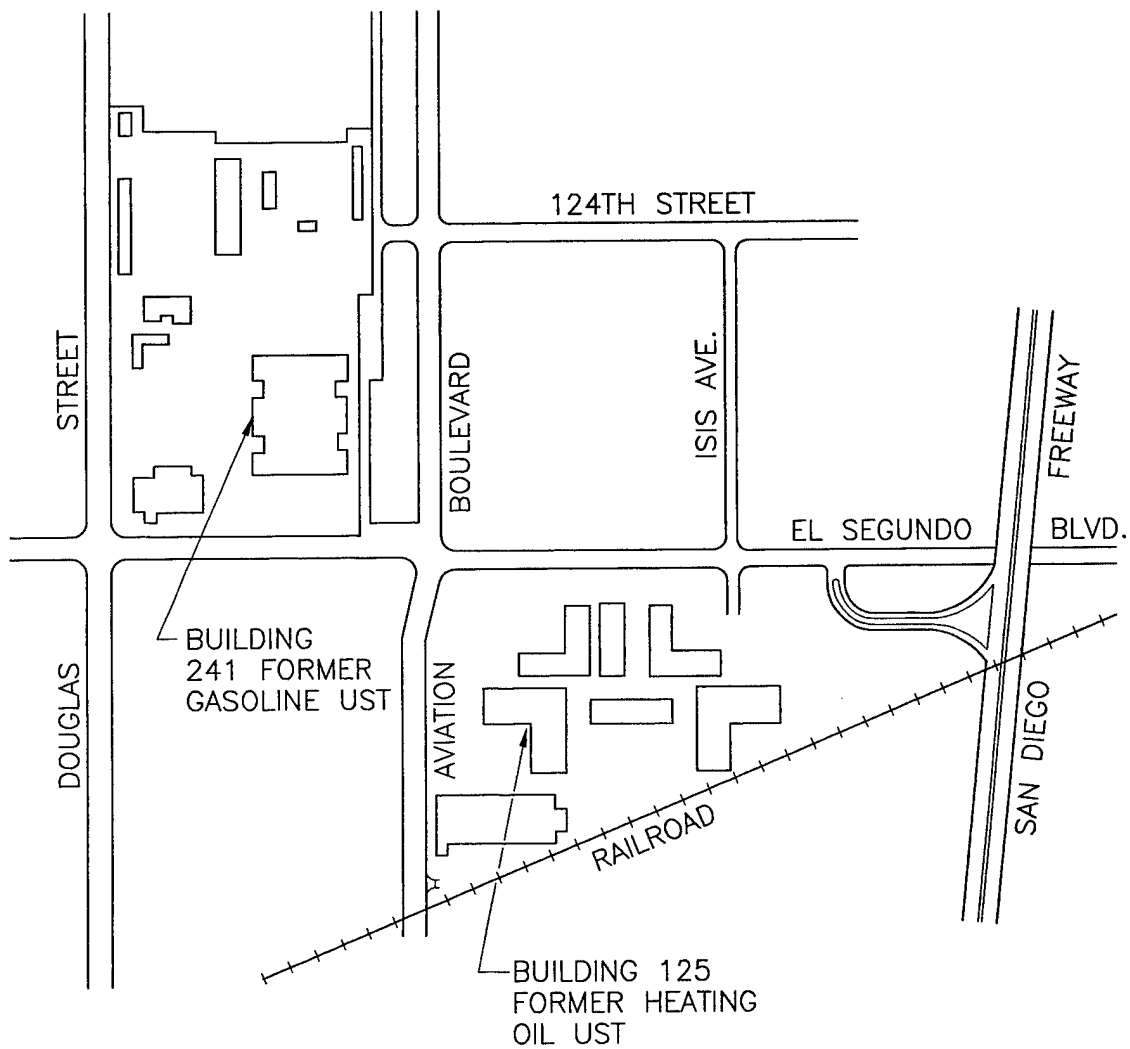
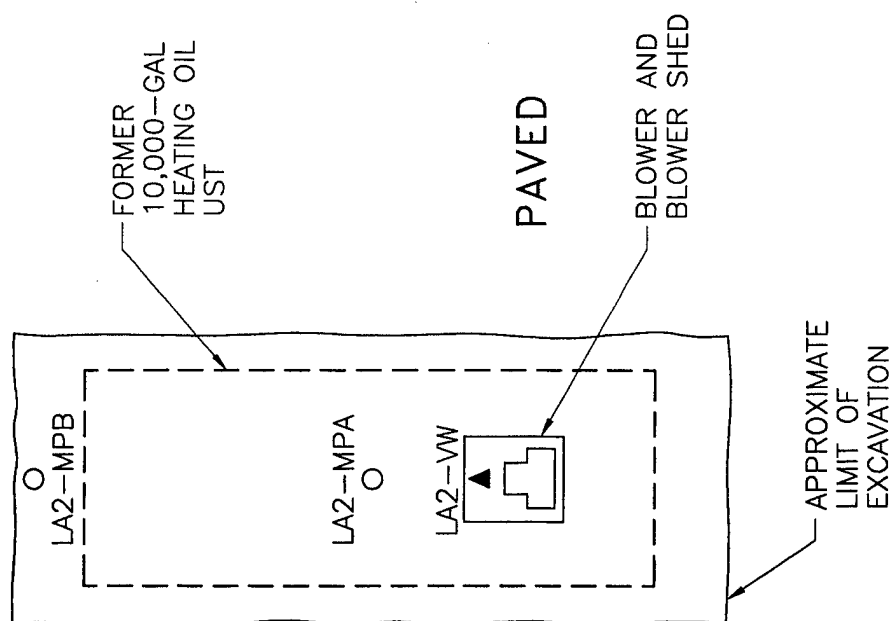


FIGURE 2.1

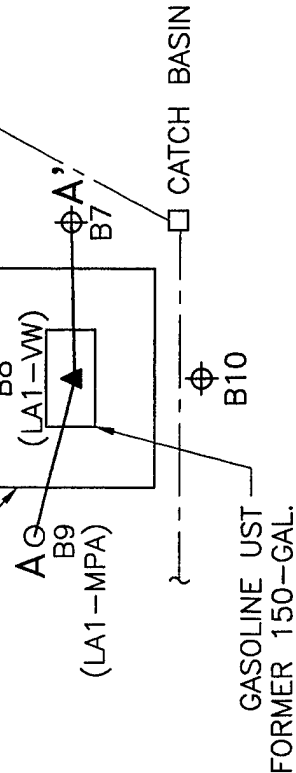
SITE
LOCATIONS
LOS ANGELES AFB, CALIFORNIA

PARSONS ENGINEERING SCIENCE, INC.



BUILDING 241

LIMIT OF EXCAVATION



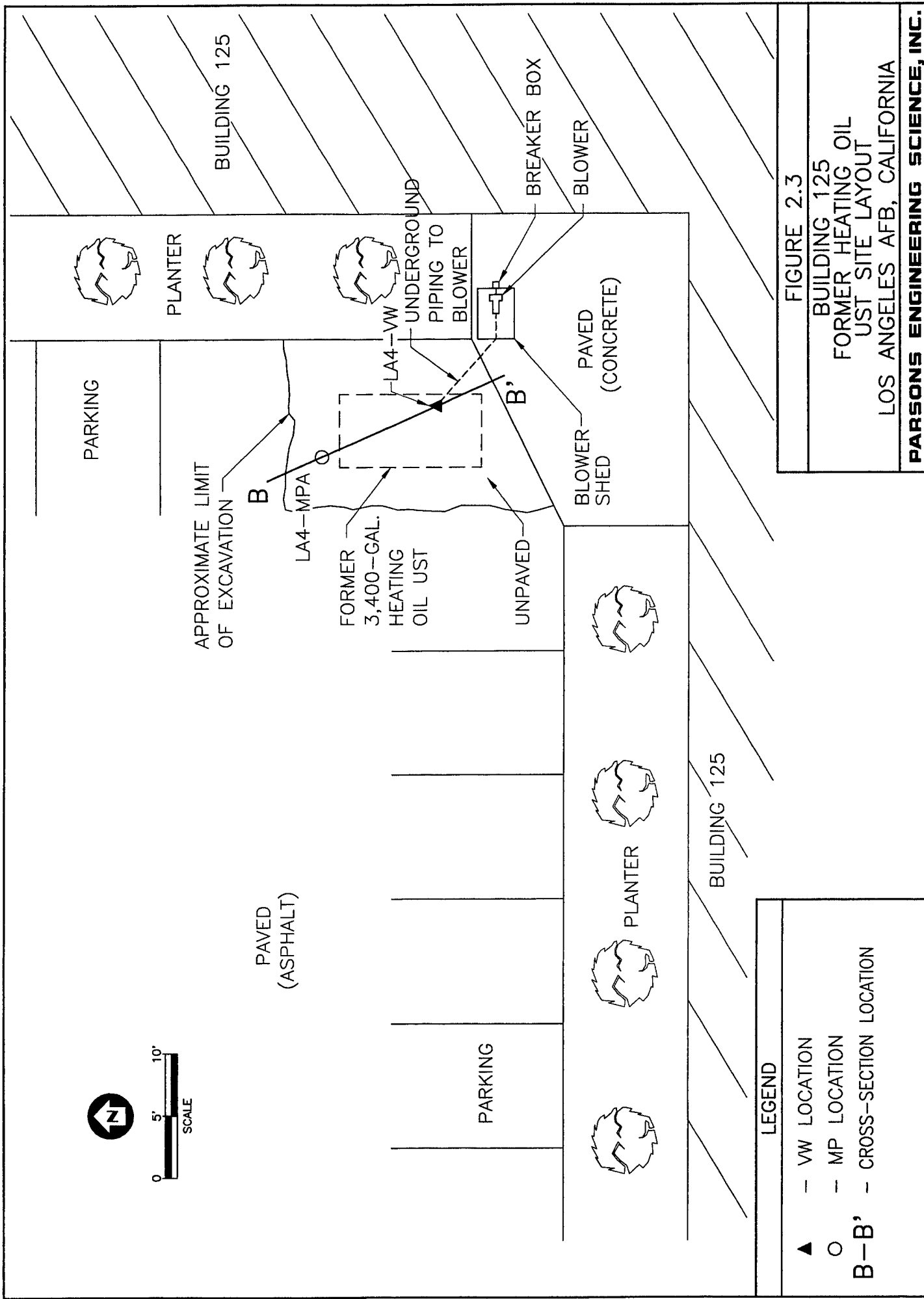
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- [] - FORMER UST LOCATION
- ▲ - VW LOCATION
- ⊕ - MITTELHAUSER BOREHOLE LOCATION
- - MP LOCATION
- A-A' - CROSS-SECTION LOCATION

FIGURE 2.2

BUILDING 241
FORMER GASOLINE
UST SITE LAYOUT
LOS ANGELES AFB, CALIFORNIA

PARSONS ENGINEERING SCIENCE, INC.



adjacent to the perimeter planter, near the building entrance (Figure 2.3). Historic information for the tank is incomplete. It is believed that the tank was installed in the mid-1950s to 1960s. The tank was removed by TetraTech in early 1993 (Hanna, 1994). Because the tank did not contain motor vehicle fuel, the LACDPW did not issue a removal permit or file number. One of two tank-bed soil samples collected during removal operations was found to contain total petroleum hydrocarbons (TPH), TRPH, ethylbenzene, and xylene. Analytical results are described in Subsection 2.5. This site is being managed under the LAABF UST Program.

2.2 SITE GEOLOGY

Los Angeles AFB is located in the western part of the Los Angeles Basin. The Los Angeles Basin is a relatively flat, lowland area between the Santa Monica and San Gabriel Mountains to the north, and the Santa Ana Mountains to the south (TetraTech, 1992). The basin is filled with up to 20,000 feet of Miocene- to Recent-aged sediments.

Geologic cross-sections for the two sites are shown in Figures 2.4 and 2.5. Previous bioventing and site investigation activities have encountered four main soil units within 57 feet bgs. A silty clay to clayey silt is encountered from just below the pavement to 10 to 12 feet bgs. This unit contains minor amounts of fine sand. From approximately 12 feet to 35 feet bgs is a well-sorted medium sand. Below this sand is a clay unit approximately 5 feet thick. A 1992 TetraTech site investigation report describes this unit as being comprised of thin silt, sand, and clay subunits. Below this clay is another sand unit. This lower sand unit extends to at least 57 feet bgs.

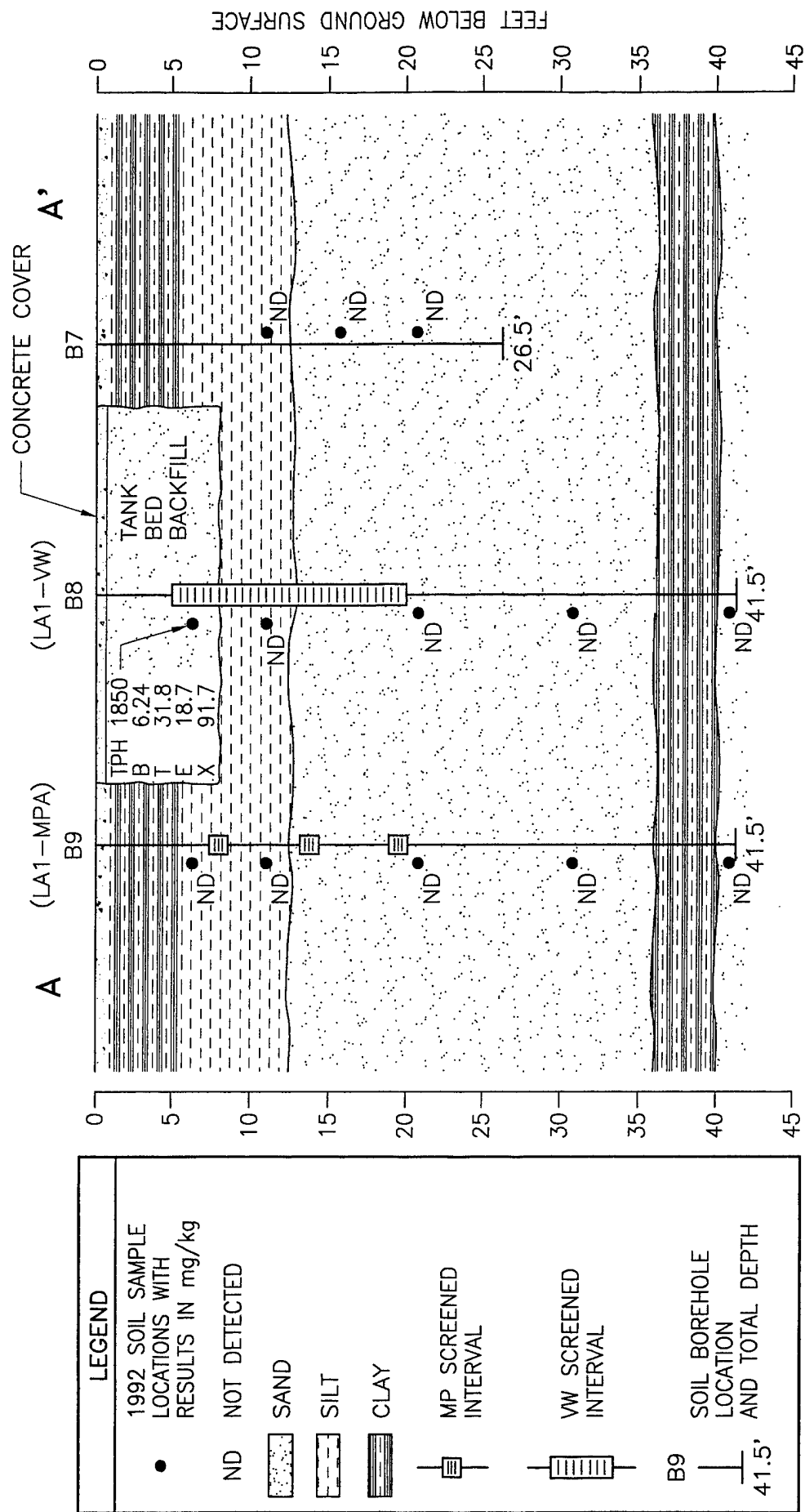
2.3 SITE HYDROGEOLOGY

On 17 January 1996, the depth to groundwater in monitoring well MW 201, located about 60 feet due west of the Building 241 Former Gasoline UST Site, was measured at 93.75 feet below the top of the well casing. The depth to groundwater in well 1318N, located at the intersection of El Segundo and Nash, approximately 3,000 feet northwest of the sites, was measured at 96.5 feet on 20 March 1990. According to Base sources (Hanna, 1994), the depth to groundwater in two monitoring wells last sampled in the early 1990s was approximately 90 feet bgs.

2.4 PREVIOUS INVESTIGATIONS AT BUILDING 241 FORMER GASOLINE UST SITE

2.4.1 UST Removal: 1990

This former 150-gallon tank was excavated and removed in August 1990 by TetraTech, Inc. Information such as the number of samples collected, sample locations, analytical method detection limits, and specific compounds detected were not available from records supplied by Los Angeles AFB. The Base reported that one tank-bed sample had a TRPH concentration of 760 milligrams per kilogram (mg/kg) and a total BTEX concentration of 6 mg/kg. The specific BTEX compounds detected were not reported (Hanna, 1994).



TPH - TOTAL PETROLEUM HYDROCARBONS
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BTEX - BENZENE, TOLUENE, ETHYLBENZENE,
TOTAL XYLENES
BY USEPA METHOD SW8020.

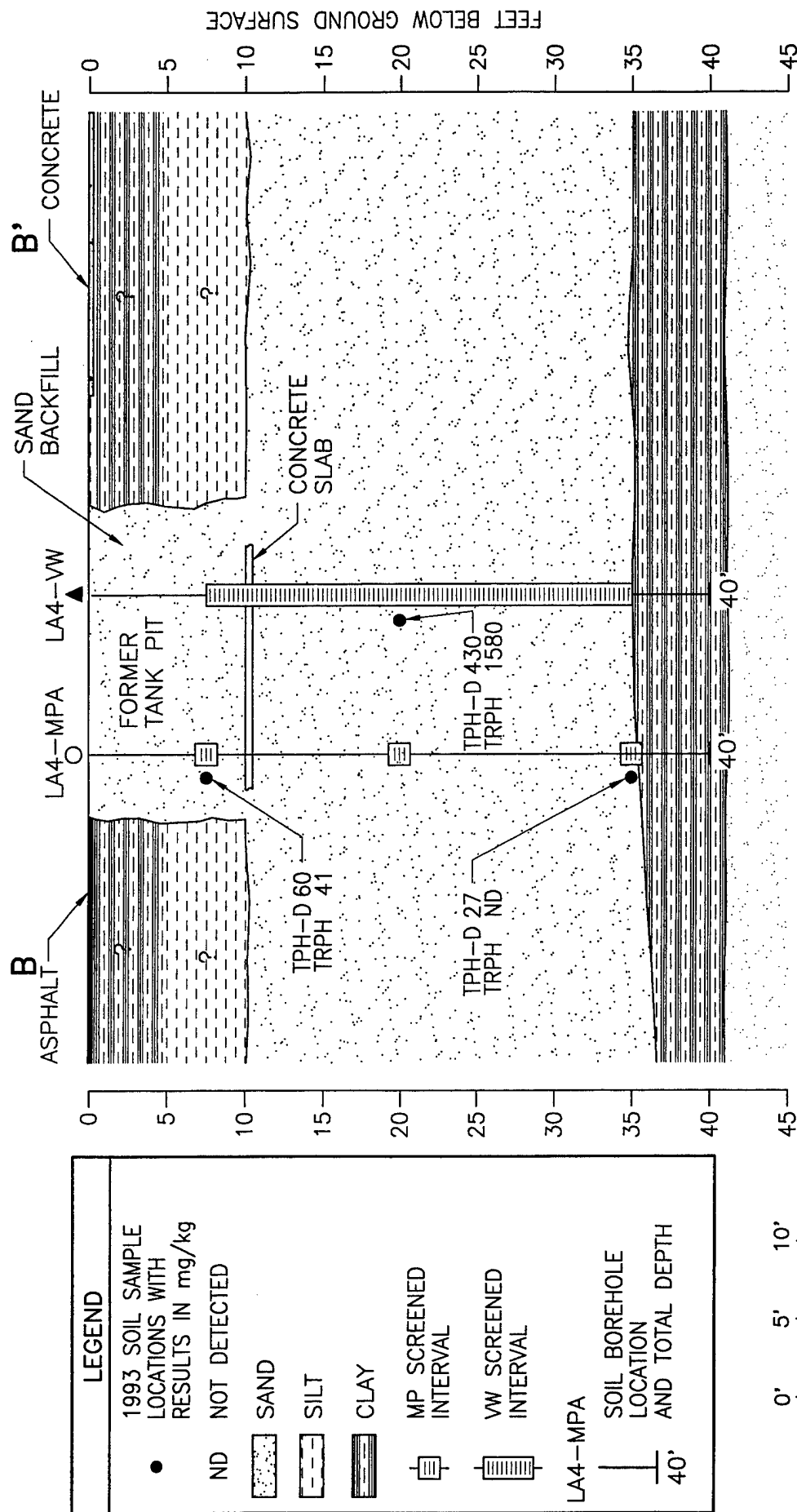
FIGURE 2.4

BUILDING 241

FORMER GASOLINE UST SITE
GEOLOGICAL CROSS-SECTION A - A'
LOS ANGELES AFB, CALIFORNIA

PARSONS ENGINEERING SCIENCE, INC.

Source: Mittelhauser, 1992.



TPH-D - TOTAL PETROLEUM HYDROCARBONS
AS DIESEL BY USEPA SW8015, MODIFIED.
TRPH - TOTAL RECOVERABLE PETROLEUM HYDROCARBONS
BY USEPA SW418.1.

FIGURE 2.5

BUILDING 125
FORMER HEATING OIL UST SITE
GEOLOGICAL CROSS-SECTION B - B'
LOS ANGELES AFB, CALIFORNIA
PARSONS ENGINEERING SCIENCE, INC.

Source: Parsons ES, 1994.

2.4.2 Soil Investigation: 1992

Additional site characterization work was performed by the Mittelhauser Corporation in July 1992. Mittelhauser drilled and sampled four boreholes (B7 through B10) in and around the former UST excavation. Results of the investigation are detailed in their October 1992 *UST Investigation Report, Los Angeles Air Force Base*. Mittelhauser borehole locations are shown on Figure 2.2. Soil sampling results are shown on Figure 2.4 and presented in Table 2.1.

Only the sample from 6 feet bgs in the borehole drilled through the former tank bed (borehole B8) had TPH as gasoline (TPH-g as analyzed using U.S. Environmental Protection Agency (USEPA) Method SW8015 Modified) and BTEX (using USEPA Method SW8020) concentrations above detection limits. This sample had a TPH-g concentration of 1,850 mg/kg, and BTEX concentrations of 6.24, 31.8, 18.7, and 91.4 mg/kg, respectively (Table 2.1). TPH-g and BTEX concentrations were all above state SSLs (Level B) which are listed in Table 2.2.

2.4.3 Bioventing: 1992-1995

During the 1992 Mittelhauser investigation, Engineering-Science, Inc. installed a bioventing air injection vent well (VW) and a vapor monitoring probe (MP) in boreholes B8 and B9, respectively. VW and MP locations and construction are shown in cross-section on Figure 2.4. However, as described in the Parsons ES (1994) *Draft Bioventing Pilot Test Interim Results Report*, initial soil gas testing at the VW and MP indicated sufficient oxygen concentrations (>5 percent) to facilitate naturally occurring bioremediation. Therefore, soil gas sampling, respiration testing, and air permeability testing was not conducted, and the air injection blower originally planned for the VW was not installed.

Beginning in July 1993, Parsons ES conducted a bioventing pilot test at the nearby Building 241 former 10,000-gallon heating oil UST, located approximately 67 feet northwest of the former gasoline UST (Figure 2.2). A VW and three MPs were installed at the former heating oil UST (Parsons ES, 1994). As part of the pilot test, an air permeability test and a respiration test were conducted at the former heating oil UST site. Air permeability testing indicated the former heating oil UST VW's zone of pressure and oxygen influence included the former gasoline UST area. The respiration test indicated hydrocarbon biodegradation rates of up to 2,800 mg of hydrocarbons per kg of soil per year in the more contaminated soil at the site (Parsons ES, 1994).

2.5 PREVIOUS INVESTIGATIONS AT BUILDING 125 FORMER HEATING OIL UST SITE

2.5.1 UST Removal: 1993

The former 3,400-gallon heating oil UST was removed in early 1993. A concrete tie-down slab was left in place at the bottom of the excavation. Information provided by Los Angeles AFB (Hanna, 1994) indicated one of the two tank-bed samples collected

Table 2.1
1992 Soil Sample Analytical Results
Building 241 Former Gasoline UST Site
Los Angeles AFB, California

Sample Number	Sample Depth (ft bgs) ^{c/}	TPH - Gas ^{a/}	USEPA Method SW8020 (mg/kg) ^{b/}			
		USEPA Method SW8015 Mod. (mg/kg)	Benzene	Toluene	Ethylbenzene	Xylenes
Detection Limits (mg/kg):		1	0.005	0.005	0.005	0.01
B7-2	11	ND ^{d/}	ND	ND	ND	ND
B7-2D	11	ND	ND	ND	ND	ND
B7-3	16	ND	ND	ND	ND	ND
B7-4	21	ND	ND	ND	ND	ND
B8-1	6	1,850	6.24	31.8	18.7	91.4
B8-2	11	ND	ND	ND	ND	ND
B8-4	21	ND	ND	ND	ND	ND
B8-6	31	ND	ND	ND	ND	ND
B8-8	41	ND	ND	ND	ND	ND
B8-D	41	ND	ND	ND	ND	ND
B9-1	6	ND	ND	ND	ND	ND
B9-2	11	ND	ND	ND	ND	ND
B9-4	21	ND	ND	ND	ND	ND
B9-6	31	ND	ND	ND	ND	ND
B9-8	41	ND	ND	ND	ND	ND
B10-2	11	ND	ND	ND	ND	ND
B10-3	16	ND	ND	ND	ND	ND
B10-4	21	ND	ND	ND	ND	ND

Source: Mittelhauser, 1992.

- ^{a/} TPH-Gas = total petroleum hydrocarbons - gasoline range.
^{b/} mg/kg = milligrams per kilogram.
^{c/} ft bgs = feet below ground surface.
^{d/} ND = nondetect.

during removal operations had elevated TPH-d (USEPA Method SW8015 Modified for diesel-range organics), TRPH, ethylbenzene, and xylene concentrations of 1,600, 4,300, 82, and 180 mg/kg, respectively. TPH-d, ethylbenzene, and xylene concentrations were above Level B SSLs (Table 2.2)

2.5.2 Bioventing: 1993-1995

Beginning in July 1993, Parsons ES conducted bioventing pilot testing activities at the Building 125 former heating oil UST site. As part of the pilot test, one VW and one MP were installed in the boreholes placed within the former UST excavation at the site. VW and MP locations are shown on Figure 2.3 and Figure 2.5. Because the project focus was on bioventing, rather than on site characterization, only limited soil sampling was performed. Three soil samples were collected, one from the VW and two from the MP, and a soil gas sample was collected from the VW. Analytical results are shown on Figure 2.5 and presented in Table 2.3. Detailed pilot testing procedures and results are presented in the bioventing report (Parsons ES, 1994). Initial testing indicated that site contamination extended from directly beneath the former UST to approximately 35 feet bgs, at which depth a clay layer was encountered. MPA, located 10 feet from the VW, had only moderate field evidence of contamination in one sample collected from tank-bed backfill material. A respiration test conducted in the VW indicated a hydrocarbon biodegradation rate of approximately 1,380 mg of hydrocarbons per kg of soil per year (Parsons ES, 1994).

Long-term air injection at the Building 125 former heating oil UST site began in December 1993, and continued until December 1994. Year-end sampling completed in January 1995 indicated a 99.9-percent reduction in total volatile hydrocarbons (TVH) in the soil gas and TRPH reductions of 83 percent and 57 percent in two of the three soil samples (Table 2.3). The year-end respiration test indicated a hydrocarbon biodegradation rate of approximately 1,000 mg/kg per year. Following year-end testing, the blower was turned back on.

Table 2.2
California Regional Water Quality Control Board
Soil Cleanup Standards ^{a/}

	Distance Above Groundwater (ft) ^{b/}		
	<40	40-150	>150
SOILS ABOVE DRINKING WATER	LEVEL A ^{c/}	LEVEL B	LEVEL C
BTEX ^{d/} + FUEL ADDITIVES ^{e/}	1 x MCL ^{f/}	10 x MCL	100 x MCL
TPH ^{g/} (Carbon Range)	(ppm) ^{h/}	(ppm)	(ppm)
C4-C12	10	100	1000
C13-C22	100	1,000	10,000
C23+	1,000	10,000	10,000
SOILS ABOVE NON-DRINKING WATER ^{i/}	LEVEL D		
	(FOR ANY DEPTH TO GROUNDWATER)		
BTEX + FUEL ADDITIVES	100 x MCL		
TPH (Carbon Range)	(ppm)		
C4-C12	1,000		
C13-C22	10,000		
C23+	15,000		

Modified from: RWQCB, 1995.

^{a/} Use of this table assumes the original source has been removed and an adequate site assessment has been completed.

^{b/} Minimum clean interval below impacted area to be determined on a site-specific basis by Regional Board staff; generally 40' above drinking waters and 20' above non-drinking waters.

^{c/} Soil levels below the appropriate levels in this table require no action, soil levels above the appropriate levels in this table must be remediated to or below provided levels, or a site-specific analysis must be conducted, or justification provided to determine more appropriate levels for an individual site.

Groundwater monitoring may be required if soil contamination linkage to groundwater impact has been confirmed.

^{d/} BTEX = Benzene, toluene, ethylbenzene, and xylenes, respectively. BTEX to be analyzed by USEPA Method 8020, or USEPA Method 8260 (usually to confirm positive benzene). For BTEX or fuel additives, each component is not to exceed 1, 10, or 100 times its MCL, as specified.

^{e/} Fuel additives = lead (Pb), ethylene dibromide (EDB), etc., including other components (i.e., PAH) of petroleum products which have MCLs.

^{f/} MCL = Maximum contaminant levels.

MCLs (ppm) for benzene = 0.001; toluene = 0.1; ethylbenzene = 0.68; xylenes = 1.75; Pb = 0.015.

Fuel Additives: (ppb) EDB = 0.02, PAH = 0.2.

^{g/} TPH = Total petroleum hydrocarbons. For TPH, the total allowable for each range is not to be exceeded, and the overall total is not to exceed the given value for the heavier TPH (C23+). TPH to be analyzed by USEPA Methods 418.1 and 8015 (Modified). Ranges of TPH to be analyzed by GC/MS carbon range methods or USEPA Method 8015 (DHS Modified). PAH to be analyzed by USEPA Method 8310.

^{h/} ppm = parts per million.

^{i/} Use of Non-Drinking Water Levels are dictated by either water characteristics as defined and exempted under SWRCB Resolution 88-63 (TDS > 3000 mg/L, deliverability < 200 gal/day, or existing contamination that cannot be reasonably treated), or as agreed upon by Regional Board staff for use at a particular site.

Table 2.3

**1993 Soil and Soil Gas Sample Analytical Results
Building 125 Former Heating Oil UST Site
Los Angeles AFB, California**

Analyte (Units) ^{a/}	Sample Location - Depth (Feet Below Ground Surface)					
	<u>LA4-VW</u>					
Soil Gas Hydrocarbons	Initial	Year-end				
TVH ^{b/} (ppmv)	2,200	0.7				
Benzene (ppmv)	ND (0.051) ^{c/}	ND (0.002)				
Toluene (ppmv)	ND (0.051)	ND (0.002)				
Ethylbenzene (ppmv)	0.089	ND (0.002)				
Xylenes (ppmv)	0.20	0.015				
	<u>LA4-VW-20'</u>	<u>LA4-MPA-7'</u>	<u>LA4-MPA-35'</u>			
Soil Hydrocarbons	Initial	Year-end	Initial	Year-end	Initial	Year-end
TPH-d ^{d/} (mg/kg)	430	NA ^{e/}	60	NA	27	NA
TRPH ^{f/}	1,580	274	41	17.8	ND (11)	34.9
Benzene (mg/kg)	ND (0.002)	ND (0.05)	ND (0.0003)	ND (0.05)	ND (0.0003)	ND (0.05)
Toluene (mg/kg)	ND (0.002)	ND (0.05)	ND (0.0003)	ND (0.05)	ND (0.0003)	ND (0.05)
Ethylbenzene (mg/kg)	ND (0.002)	ND (0.05)	ND (0.0003)	ND (0.05)	ND (0.0003)	ND (0.05)
Xylenes (mg/kg)	ND (0.004)	ND (0.10)	ND (0.0007)	ND (0.10)	ND (0.0007)	ND (0.10)

Source: Parsons ES, 1994.

- ^{a/} ppmv = parts per million, volume per volume; mg/kg = milligrams per kilogram.
^{b/} TVH = total volatile hydrocarbons referenced to jet fuel (Molecular weight = 156).
^{c/} ND = Not detected, detection limit given in parentheses.
^{d/} TPH-d = total petroleum hydrocarbons as diesel fuel by USEPA Method SW8015 Modified.
^{e/} NA = Not analyzed.
^{f/} TRPH = total recoverable petroleum hydrocarbons by USEPA Method 418.1.

SECTION 3

SITE CLOSURE SAMPLING ACTIVITIES

The purpose of this section is to summarize site closure and sampling activities including: borehole locations and sampling depths; soil sampling procedures; analytical methods used; and QA/quality control (QC) procedures followed. These methods/procedures are more fully described in the closure SAP for Building 241 Former Gasoline UST Site and Building 125 Former Heating Oil UST Site (Parsons ES, 1995) (see Appendix A). The closure SAP was implemented by a California Registered Geologist as required by the RWQCB (1995) *Interim Site Assessment and Clean-up Guidebook*.

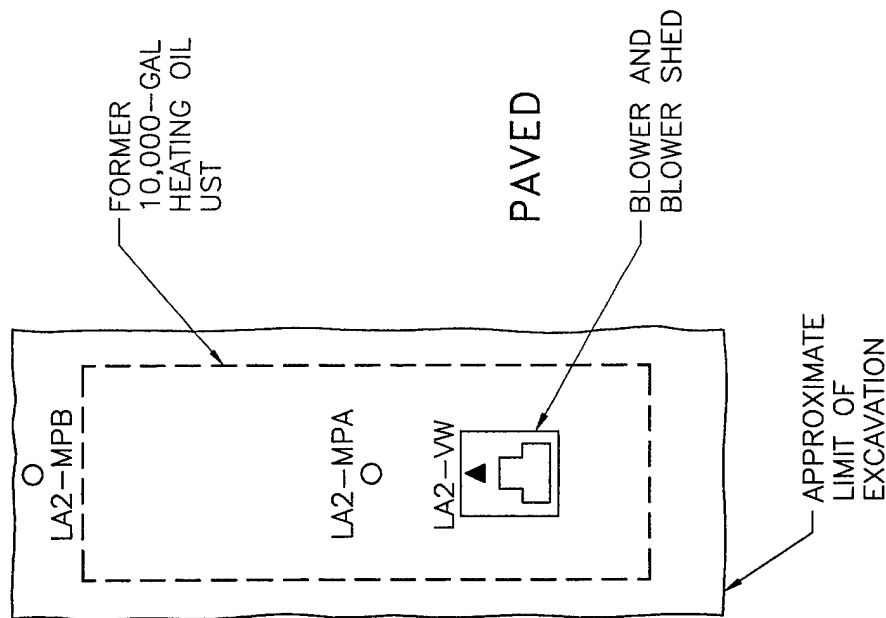
3.1 SITE CLOSURE BOREHOLE LOCATIONS AND SAMPLING DEPTHS

3.1.1 Building 241 Former Gasoline UST Site

Closure sampling was conducted at this site on 16 January 1996. To confirm that site contamination has been remediated to within acceptable levels, Parsons ES drilled and sampled one borehole (241CB1). The borehole, shown on Figure 3.1, was located in the former tank bed approximately 2 feet south of the VW. The VW (former borehole B8) was the only previous site investigation borehole in which contamination was encountered. Soil samples for chemical analysis were collected at 5, 7, and 9 feet bgs. Field evidence of contamination (i.e., soil with above-background photoionization detector (PID) readings, petroleum odor, or discoloration) was detected in the 5-foot sample. This sample had a strong odor of weathered petroleum and a PID reading of 115.5 parts per million volume per volume (ppmv).

3.1.2 Building 125 Former Heating Oil UST Site

Closure sampling for this site was conducted on 16 and 17 January 1996. Four boreholes (125CB1 through 125CB4) were drilled and sampled. Borehole locations are shown on Figure 3.2. Soil samples were collected at 5-foot intervals to a total depth of 46.5 feet bgs. This depth was about 10 feet below the depth at which any field evidence of contamination was detected. This depth was also about 5 feet below the bottom of a laterally extensive clay layer approximately 5 to 6 feet thick. Borehole 125CB2 was located about 3.5 feet northwest of the VW, through the approximate center of the former tank bed. Boreholes 125CB1, 125CB3, and 125CB4 were located 7.5, 10.8, and 12.5 feet from the VW, respectively, around the perimeter of the former tank bed excavation. All samples from 125CB2 were submitted for laboratory analysis, as requested by the RWQCB.



LEGEND	
[---]	FORMER UST LOCATION
▲	VW LOCATION
⊕	MITTELHAUSER BOREHOLE LOCATION
○	MP LOCATION
⊙	CLOSURE BOREHOLE LOCATION

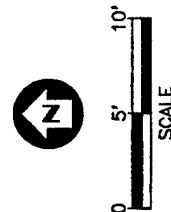


FIGURE 3.1

BUILDING 241
FORMER GASOLINE UST SITE
CLOSURE BOREHOLE LOCATION
LOS ANGELES AFB, CALIFORNIA
PARSONS ENGINEERING SCIENCE, INC.



Any soil sample from the remaining boreholes with field evidence of contamination was retained for analysis. Additional samples were retained to confirm nondetect field screening results. The deepest sample from each borehole was also retained for analysis. The samples from 125CB1-35', 125CB2-31.5', and 125CB2-36.5' had field evidence of contamination. A slight to moderate petroleum odor and PID readings ranging from 0.0 to 30.0 ppm were detected in these samples. A total of 25 soil samples were retained for analysis from all four boreholes.

3.2 DRILLING, SAMPLING, AND EQUIPMENT DECONTAMINATION

Boreholes were advanced using a drill rig equipped with 6-inch outside-diameter (OD) hollow-stem augers. Soil cuttings generated during drilling were placed in U.S. Department of Transportation (DOT)-approved, 55-gallon drums. The drums were labeled with the site name, drilling date, borehole number, depth intervals, and Base point-of-contact. Drums were transported by the drilling subcontractor to Base storage areas as directed by the Base point-of-contact.

Boreholes were logged by a Parsons ES geologist registered in the State of California. Soil types were classified according to the Unified Soil Classification System (USCS) and described in accordance with the standard Parsons ES soil description format. These geologic borehole logs can be reviewed in Appendix B of this report.

Before use and between boreholes, augers and other downhole equipment were cleaned to avoid cross-contamination. Cleaning was accomplished using a high-pressure hot-water wash, followed by a potable water rinse. Decontamination fluids were collected and contained in a labeled 55-gallon drum.

Relatively undisturbed soil samples, suitable for chemical analysis, were collected at approximately 5-foot intervals. Soil samples were collected in a 2.5-inch inside-diameter (ID) split-barrel sampler that was lowered through the hollow stem of the augers and driven approximately 1.5 feet into undisturbed soil, ahead of the augers. Between sampling events, the split-barrel sampler was cleaned with Alconox[®] detergent, followed by successive potable and distilled water rinses.

The split-barrel sampler was fitted with three precleaned, 2.5-inch OD by 6-inch-long, thin-walled, brass sleeves. Before samples were collected, sample sleeves were cleaned using the same procedure as that described for the sampler. After collection of a sample, the sampler was retrieved, split apart, and the sleeves were removed. The ends of the lowest sleeves that contain the samples for chemical analyses were covered with aluminum foil and plastic end caps.

Samples in the upper sleeves were used for logging purposes, and were screened in the field for organic vapors using a PID. The data obtained from the logging and screening were recorded on borehole logs.

The sleeves for chemical analysis were labeled with the site name and borehole number, sample depth interval, date of collection, and other pertinent data. These sleeves were immediately sealed in plastic bags and placed in an insulated shipping container with ice. The samples were maintained in a chilled condition until delivered to Quanterra

Environmental Services located in Santa Ana, California. Chain-of-custody records were prepared in the field and accompanied the samples to the analytical laboratory.

After sampling, boreholes were backfilled with bentonite chips (hole plug) to approximately 1 foot bgs. The bentonite was hydrated during placement at a rate of 2 to 5 gallons of water per 50-pound bag of chips. A concrete cap approximately 1 foot thick was placed on top of the bentonite.

Because the Building 241 Gasoline UST Site is within the zone of oxygen influence of the bioventing system installed at the nearby Building 241 Former Heating Oil UST Site, the VW and MP at the Gasoline UST Site were abandoned after site closure sampling was completed. Abandonment consisted of drilling out the VW and MP with the hollow-stem auger drill rig. The holes were backfilled with bentonite chips and concrete as previously described. The VW and MP at the Building 125 Former Heating Oil UST Site were left undisturbed, and the blower system was restarted after the above-described site activities were completed. Should site closure be granted, Los Angeles AFB should make arrangements for the VW and MP to be properly abandoned (abandonment is not currently included in Parsons ES' scope of work).

3.3 FIELD AND LABORATORY DATA QUALITY ASSURANCE/QUALITY CONTROL

Four field QA/QC samples were collected during field activities. The samples included a field duplicate, an equipment rinsate blank, and a trip blank. Also, additional sampling volume was submitted in order for the laboratory to run matrix spike/matrix spike duplicate (MS/MSD) analyses.

3.4 SOIL SAMPLE ANALYSIS

All samples were analyzed by Quanterra Environmental Services, a California state-certified and AFCEE-approved laboratory. All soil samples were analyzed by USEPA Method SW8020 for BTEX. Soil samples from the Building 241 Former Gasoline UST Site were analyzed by USEPA Method SW8015 Modified for total volatile petroleum hydrocarbons (TVPH) as gasoline, and by USEPA Method 7421 for total lead. Soil samples from the Building 125 Former Diesel UST Site were analyzed by USEPA Method SW8015 Modified for TEPH as diesel fuel, and by USEPA Method 418.1 for TRPH.

3.5 DATA VALIDATION

Laboratory data were subjected to the data validation process described below. Based on this process, data used to support a closure recommendation are considered valid.

3.5.1 Chain-of-Custody Check

The chain-of-custody documents were reviewed for completeness and accuracy. These documents did not show any breaks in custody. All required signatures, affiliations, times, and dates were present and legible. Dates and sample numbers were consistent with

project analytical reports. At the request of Parsons ES, soil samples from the Building 125 Former Heating Oil UST Site were not analyzed by USEPA Method 8015 Modified for gasoline. This analytical method was mistakenly indicated on the chain-of-custody forms.

3.5.2 Holding Time Check

The sample holding time is the method-specified time allowable from sample collection to sample preparation, extraction, or analysis. All sample analyses should be conducted within the holding time specific to each analytical method. Holding times for all samples were determined from documented laboratory preparation/analysis dates and compared with the sampling dates on the chain-of-custody forms. All of the results on the laboratory summary forms were checked to ensure that the reported analyses were conducted within the specified holding times. No holding times were exceeded for any of the closure samples.

3.5.3 Analytical Report Review

Laboratory reports were provided for environmental samples, the trip blank, the equipment rinsate, laboratory control samples and laboratory control sample duplicates. The reports were checked for the following information:

1. Name of laboratory and address.
2. Name of client.
3. Analytical method used (title and method number).
4. Sample identification (client and laboratory numbers).
5. Dates samples were received, extracted/digested, analyzed and reported.
6. Sample matrix.
7. Parameters tested.
8. Agreement with chain-of-custody.
9. Reporting units.
10. Concentration of each parameter found.
11. Reporting limit for each parameter in each method.
12. Dilution factor.
13. Signature of laboratory supervisor or director.

The analytical report narrative must specify any modifications to the analytical methods performed as well as any unusual situations or problems encountered during analysis or shipment (e.g., exceeded holding times, breakdown in procedures, interference, contaminants). It should also include a summary of any corrective actions. The report should include an explanation of terminology, acronyms, and special notations used in the report. The analytical reports were complete, and no unusual circumstances were noted.

3.5.4 Review of Quality Control Samples

The analysis of blank sample results is to determine the existence and magnitude of contamination problems during sampling, handling, and analysis. No contaminants should be present in the blanks. If contamination exists in any blank sample, the data associated with the blank must be carefully evaluated to determine whether or not inherent variability of the data exists, or if the problem is an isolated occurrence not affecting other data. All of the results on the laboratory summary forms were reviewed to ensure that reported results met required QC criteria.

3.5.4.1 Field Duplicate

Duplicate soil samples are a measure of precision. Relative percent differences (RPDs) between analyzed concentrations of samples taken in duplicate in the field should fall within acceptable limits for those analyses. A field duplicate of the soil matrix was collected from borehole 125CB3 at 6-6.5 feet bgs. This duplicate was labeled 125CB5, 10-10.5 feet and included with the other samples sent to the laboratory. Results of both the primary sample and the field duplicate were nondetect.

3.5.4.2 Trip Blanks

Trip blanks are indicators of possible sample exposure to contamination during shipping. A trip blank was prepared using reagent-grade water and accompanied soil samples for volatile organic analysis in the shipping container from the sampling location to the laboratory. Contamination was not detected in the trip blank associated with the sampling event.

3.5.4.3 Rinsate Blanks

Rinsate blanks are prepared by collecting distilled water that is poured through a decontaminated split-barrel sampler. This serves as an equipment decontamination check. Contamination was not detected in the rinsate blank associated with the sampling event.

3.5.5 Matrix Spike/Matrix Spike Duplicate Analysis

The MS/MSD data are generated to determine long-term precision and accuracy of the analytical method with respect to the various matrices subject to analysis. The percent recovery of a spike was calculated by the laboratory and compared with an acceptable range specific to each method. The precision of each method was assessed by calculating the RPD from the MS/MSD analysis and comparing the value with an acceptable range established for each method. All of the results on the laboratory data summary forms were reviewed to ensure that reported results met required QC criteria. The laboratory reported that all surrogate spike criteria and RPD data met QC criteria.

SECTION 4

CONCLUSIONS AND RECOMMENDATIONS

This section summarizes the analytical results from the closure sampling activities. Based on earlier site investigations, bioventing pilot testing, and on the results of the closure sampling event, conclusions regarding remediation of fuel contamination are summarized, and recommendations are presented.

4.1 CLOSURE SAMPLE LABORATORY RESULTS

Complete laboratory analytical results from Quanterra Environmental Services are presented in Appendix C.

4.1.1 Building 241 Former Gasoline UST Site

Analytical results for this site are summarized in Table 4.1. All laboratory test results for BTEX and TVPH as gasoline were nondetect. Lead was detected at concentrations ranging from 11.8 mg/kg to 15.2 mg/kg.

4.1.2 Building 125 Former Heating Oil UST Site

Analytical results for this site are summarized in Table 4.2 and shown on Figure 4.1. All laboratory test results for BTEX were nondetect. Test results for 125CB1-35', 125CB2-26', and 125CB2-31' had TEPH-d concentrations of 1,500, 5,200, and 4,000 mg/kg, respectively. These three results are above the state SSLs. Two other samples, 125CB2-5', and 125CB2-36' had TEPH and/or TRPH concentrations above detection limits but below state SSLs (RWQCB, 1995).

4.2 MIGRATION EVALUATION

Soil screening levels have been established by the state. The goal of these SSLs is to protect underlying groundwater quality from adverse impacts due to contamination leaching from soils. The SSLs are non-site specific, which means they may overestimate or underestimate the level of residual contamination that can remain on site and still protect groundwater quality given site specific conditions. However, state guidelines allow for the incorporation of site specific factors into target soil concentrations through the use of an attenuation factor. The attenuation factor describes how contaminants migrate through soil into underlying groundwater. These attenuation factors are chemical specific and require target groundwater concentrations. Unfortunately, TEPH-d is not a specific chemical, but a range of hydrocarbons. There also is no groundwater target concentrations for TEPH-d. In place of an attenuation factor, the observed attenuation rate was used to predict the fate of TEPH left in place. The attenuation rate is shown on

Table 4.1

Closure Soil Sampling Analytical Results January 1996
Building 241 Former Gasoline UST Site
Los Angeles AFB, California

Borehole I.D.	Sample Depth (feet bgs) ^{b/}	Matrix	USEPA Method					
			SW 8015M	SW 7421	SW 8020			
			Mod. Gasoline ^{a/} (mg/kg) ^{c/}	Lead (mg/kg)	Benzene (µg/kg) ^{d/}	Toluene (µg/kg)	Ethylbenzene (µg/kg)	Xylenes (µg/kg)
241CB1	5	Soil	<1.3 ^{d/}	11.8	<1.3	<6.3	<6.3	<6.3
	7	Soil	<1.3	12.4	<1.3	<6.4	<6.4	<6.4
	9 ^{e/}	Soil	<1.3	15.2	<1.3	<6.4	<6.4	<6.4
			(mg/L) ^{e/}		(µg/L) ^{e/}	(µg/L)	(µg/L)	(µg/L)
Trip Blank	NA ^{f/}	Water	<0.1	-- ^{g/}	<1.0	<0.5	<0.5	<0.5
Rinseate Blank	NA	Water	<0.1	--	<1.0	<0.5	<0.5	<0.5

^{a/} Total Volatile Petroleum Hydrocarbons as gasoline (carbon range = C6-C12).

^{b/} feet bgs = feet below ground surface.

^{c/} mg/kg = milligrams per kilogram.

^{d/} µg/kg = micrograms per kilogram.

^{e/} Analyte not detected at the reporting limit.

^{f/} Matrix spike/matrix spike duplicate run on this sample.

^{g/} mg/L = milligrams per liter.

^{h/} µg/L = micrograms per liter.

^{i/} NA = Not applicable.

^{j/} -- = Not analyzed.

Table 4.2
Closure Soil Sampling Analytical Results January 1996
Building 125 Former Heating Oil UST Site
Los Angeles AFB, California

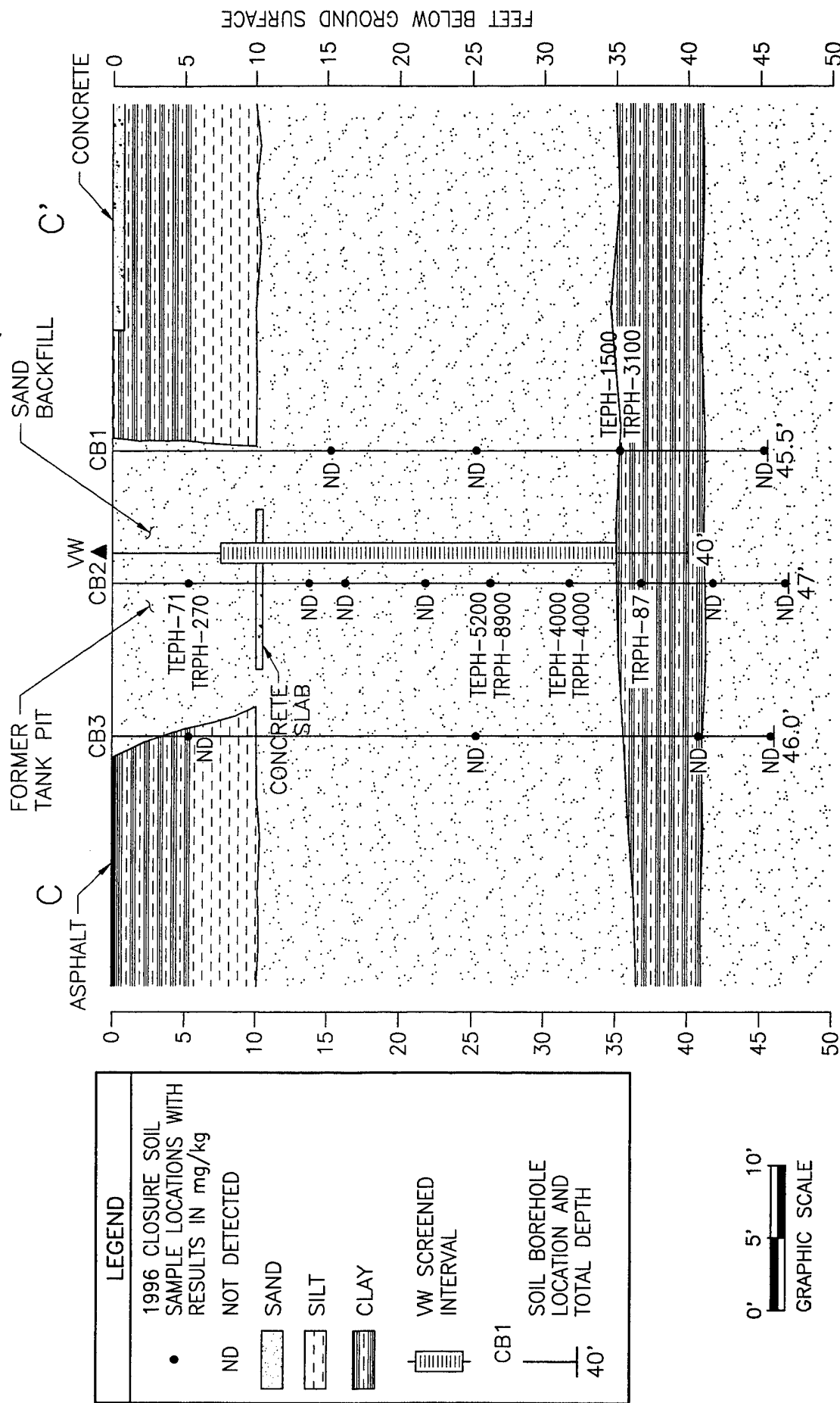
Borehole I.D.	Sample Depth (feet bgs) ^{c/}	Matrix	USEPA Method					
			SW 8015M	SW 418.1	SW 8020			
			Mod. Diesel ^{a/} (mg/kg) ^{d/}	TRPH ^{b/} (mg/kg)	Benzene (µg/kg) ^{e/}	Toluene (µg/kg)	Ethylbenzene (µg/kg)	Xylenes (µg/kg)
125CB1	15	Soil	<11 ^{f/}	<11	<1.1	<5.3	<5.3	<5.3
	25	Soil	<10	<10	<1.0	<5.2	<5.2	<5.2
	35	Soil	1500 ^{g/}	3100	<740	<740	<740	<740
	40	Soil	<15	<15	<1.5	<7.4	<7.4	<7.4
	45	Soil	<11	<11	<1.5	<5.3	<5.3	<5.3
125CB2	5	Soil	71 ^{h/}	270	<1.5	<5.5	<5.5	<5.5
	13.5	Soil	<11	<11	<1.1	<5.4	<5.4	<5.4
	16	Soil	<11	<11	<1.1	<5.4	<5.4	<5.4
	21	Soil	<11	<11	<1.1	<5.3	<5.3	<5.3
	26	Soil	5200 ^{i/}	8900	<1.0	<5.2	<5.2	<5.2
	31	Soil	4000 ^{j/}	4000	<1.0	<5.2	<5.2	<5.2
	36	Soil	<13	87	<320	<320	<320	<320
	41	Soil	<14	<14	<1.4	<7.0	<7.0	<7.0
	46	Soil	<11	<11	<1.1	<5.5	<5.5	<5.5
	6	Soil	<12	<12	<1.2	<6.0	<6.0	<6.0
	6 (duplicate)	Soil	<11	<11	<1.1	<5.7	<5.7	<5.7
125CB3	25.5	Soil	<11	<11	<1.1	<5.5	<5.5	<5.5
	40.5	Soil	<14	<14	<1.4	<7.0	<7.0	<7.0
	45.5	Soil	<11	<11	<1.1	<5.4	<5.4	<5.4
	5.5 ^{k/}	Soil	<11	<11	<1.1	<5.6	<5.6	<5.6
	10.5	Soil	<11	<11	<1.1	<5.7	<5.7	<5.7
125CB4	15.5 ^{k/}	Soil	<11	<11	<1.1	<5.5	<5.5	<5.5
	20.5	Soil	<11	<11	<1.1	<5.5	<5.5	<5.5
	30.5	Soil	<10	<10	<1.0	<5.2	<5.2	<5.2
	35.5	Soil	<13	<13	<1.3	<6.3	<6.3	<6.3
	45.5	Soil	<11	<11	<1.1	<5.5	<5.5	<5.5

Table 4.2 (continued)
Closure Soil Sampling Analytical Results January 1996
Building 125 Former Heating Oil UST Site
Los Angeles AFB, California

Borehole I.D.	Sample Depth (feet bgs)	Matrix	USEPA Method					
			SW 8015M	SW 418.1	SW 8020			
			Mod. Diesel (mg/kg)	TRPH (mg/kg)	Benzene (µg/kg)	Toluene (µg/kg)	Ethylbenzene (µg/kg)	Xylenes (µg/kg)
125CB5	10	Soil	<11	<11	<1.1	<5.7	<5.7	<5.7
Trip Blank	NA ^{m/}	Water	-- ^{iv}	--	(µg/L) ^v	(µg/L)	(µg/L)	(µg/L)
Rinseate Blank	NA	Water	--	--	<1.0	<0.5	<0.5	<0.5

^{a/} Total Extractable Petroleum Hydrocarbons as diesel fuel
(carbon range = C13-C22 except as noted).
^{b/} Total Recoverable Petroleum Hydrocarbons.
^{c/} feet bgs = feet below ground surface.
^{d/} mg/kg = milligrams per kilogram.
^{e/} µg/kg = micrograms per kilogram.
^{f/} Analyte not detected at the reporting limit.
^{g/} Carbon range = C10-C22+.

^{h/} Carbon range = C13-C22+.
^{i/} Carbon range = C12-C22+.
^{j/} Carbon range = C11-C22+.
^{k/} Matrix spike/matrix spike duplicate run on this sample.
^{l/} µg/L = micrograms per liter.
^{m/} NA = Not applicable.
^{n/} -- = Not analyzed.



TEPH - TOTAL EXTRACTABLE PETROLEUM HYDROCARBONS AS DIESEL FUEL BY USEPA SW8015, MODIFIED.
 TRPH - TOTAL RECOVERABLE PETROLEUM HYDROCARBONS BY USEPA SW418.1.

FIGURE 4.1

BUILDING 125
 FORMER HEATING OIL UST SITE
 CLOSURE SOIL SAMPLE RESULTS
 LOS ANGELES AFB, CALIFORNIA
 PARSONS ENGINEERING SCIENCE, INC.

Table 4.3. This rate was based on the observed attenuation, over depth, between two consecutive samples from borehole 125CB2 with detectable hydrocarbon contamination. This rate is conservative in that it does not take into account site conditions such as the laterally extensive clay layer from approximately 36 to 41 feet bgs. Site sampling above and below this clay layer has shown it to be an effective barrier to further downward migration. The observed attenuation rate indicates that, by 61 feet bgs, TEPH-d concentrations would be below 1 mg/kg. Therefore, site groundwater, at approximately 90 feet bgs, would not be impacted by the remaining contamination.

4.3 CONCLUSIONS

4.3.1 Building 241 Former Gasoline UST Site

Borehole 241CB1 was located within the former tank bed, adjacent to the only previous borehole with field evidence or laboratory analytical results detecting hydrocarbon contamination. Soil samples were collected from within, at the bottom, and just below the former tank bed. The sample from within the former tank bed had a strong weathered petroleum odor and a field PID reading of 115.5 ppmv. However, none of the samples had TVPH or BTEX laboratory results above detection limits.

Total lead concentrations ranged from 11.8 to 15.2 mg/kg, which is well below the California Primary Remediation Goal of 400 mg/kg. This range also is below the upper limit of 250 mg/kg for lead that can naturally occur in soil (Brady, 1974).

4.3.2 Building 125 Former Heating Oil UST Site

Borehole 125CB2, located within the former tank bed, and borehole 125CB1, about 7 feet south of 125CB2 (Figure 3.2) were the only two boreholes where field or laboratory evidence of contamination was detected in soil samples. The other two site boreholes, located about 10 and 12 feet away from the former tank pit center (Figure 3.2) had no field evidence of contamination. Eleven soil samples from these two boreholes were selected for laboratory analysis to confirm the nondetect field screening results; laboratory results were nondetect (Table 4.2).

Soil with petroleum concentrations above state SSLs is restricted to a zone about 10 feet thick immediately above a clay layer (Figure 4.1). The zone decreases in thickness with increasing distance from the tank bed center, and extends laterally less than 10 feet. The clay layer is approximately 5 feet thick and appears to be laterally extensive, both at this site and throughout the Base. All soil samples collected below this clay layer had no field evidence or laboratory analytical results indicating hydrocarbon contamination. Therefore, the clay layer appears to be an effective barrier preventing significant downward contamination migration. Groundwater at this site is estimated to occur at a depth of at least 90 feet bgs, or more than 50 feet below the lower limit of the clay layer. The observed attenuation rate, which does not include the positive effect of the clay layer, indicates that by 61 feet bgs downward migrating TEPH concentrations would be less than 1 mg/kg.

Table 4.3
Estimation of Downward Migration Potential of C10-C22 Carbon Fraction
Building 125 Former Heating Oil UST Site
Los Angeles AFB, California

Depth (feet bgs) ^{b/}	Maximum Projected Concentration of C10-C22 ^{a/} (mg/kg)	
	125CB1 ^{c/}	125CB2 ^{d/}
26	ND	5200 ^{e/}
31	NA	4000 ^{e/}
36	1500 ^{e/}	920
41	345	212
46	79	49
51	18	11
56	4	3
61	1	6E-01
66	2E-01	1E-01
71	5E-02	3E-02
76	1E-02	7E-03
81	3E-03	2E-03
86	6E-04	4E-04
91	1E-04	9E-05

ND = nondetect

NA = not analyzed

^{a/} Projected attenuation with distance based on measured vertical stratification.

^{b/} Feet below ground surface.

^{c/} Sampling location 125CB1.

^{d/} Sampling location 125CB2.

^{e/} Measured concentration of C10-C22 carbon fraction.

^{f/} Calculated concentration that conservatively could migrate to this depth given an observed attenuation rate of at least 23 % every 5 feet.

4.4 RECOMMENDATIONS

4.4.1 Building 241 Former Gasoline UST Site

Given the site closure sample analytical results summarized above, no further remedial action is warranted at the Building 241 Former Gasoline UST Site, and site closure is recommended for this site. All site soil sample concentrations are below applicable state SSLs and it is requested that the RWQCB approve closure for the Building 241 Former Gasoline UST Site.

4.4.2 Building 125 Former Heating Oil UST Site

Closure sampling has detected a maximum of one cubic yard of soil with TEPH-d concentrations above state SSLs. The upper limit of this contamination starts at approximately 26 feet bgs. Due to its depth, this contamination poses little risk to potential human receptors via direct exposure pathways. As described in Subsections 4.2 and 4.3.2, site contamination poses no risk to groundwater. Therefore, it is requested that the RWQCB approve closure for the Building 125 Former Heating Oil UST Site.

SECTION 5

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APPENDIX A

FINAL CLOSURE SAMPLING AND ANALYSIS PLAN

FINAL

**Closure Sampling and Analysis Plan
for
Building 241 Former Gasoline UST Site and
Building 125 Former Heating Oil UST Site
Los Angeles AFB, California**

Prepared For

**Air Force Center for Environmental Excellence
Brooks AFB, Texas**

and

Los Angeles AFB, California

Parsons Engineering Science, Inc.

July 1995

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FINAL

**Closure Sampling and Analysis Plan
for
Building 241 Former Gasoline UST Site and
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Los Angeles AFB, California**

Prepared for:

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SECTION 1

INTRODUCTION

This site closure sampling and analysis plan (SAP) has been prepared by Parsons Engineering Science, Inc. (Parsons ES) for submittal to the California Regional Water Quality Control Board - Los Angeles Region (RWQCB). The RWQCB has assumed oversight of underground storage tank (UST) work at military facilities from the Los Angeles County Department of Public Works (LACDPW), Waste Management Division.

During the past two years, Los Angeles Air Force Base (LA AFB) has participated in the Air Force Bioventing Pilot Test Initiative Project. Sponsored by the Air Force Center for Environmental Excellence (AFCEE) at Brooks AFB, Texas, the project included conducting more than 135 *in situ* bioventing pilot tests at 48 Air Force installations throughout the country. These tests were designed to collect data on the effectiveness of bioventing for the remediation of soil contaminated with fuel hydrocarbons (i.e., JP-4 jet fuel, diesel fuel, gasoline, heating oil, etc.). One-year-long bioventing pilot tests have recently been concluded at three LA AFB sites. Based on the results of these one-year tests, *in situ* bioventing has been effective enough to support closure of the Building 241 former 150-gallon gasoline UST and the Building 125 former 3,400-gallon heating oil UST sites at LA AFB. This SAP presents a plan for confirmation soil sampling to document the effectiveness of soil remediation at these two sites and to demonstrate compliance with regulatory requirements for closure.

This SAP consists of six sections, including this introduction. Section 2 includes site descriptions, histories, and summaries of previous investigations and remediation activities. Section 3 summarizes all applicable site closure requirements. A detailed site closure SAP is presented in Section 4. Analytical results will be presented in a site closure report as described in Section 5. Section 6 provides references cited in this SAP. It is anticipated that analytical results will support a no-further-action recommendation, and that the RWQCB will grant site closure.

SECTION 2

SITE DESCRIPTION AND HISTORY

LA AFB is located in El Segundo, California, approximately two miles south of Los Angeles International Airport. LA AFB lies north and south of El Segundo Boulevard, between Douglas Avenue to the west and the San Diego Freeway (405) to the east (Figure 2.1). In the immediate vicinity of LA AFB are other defense and aerospace industries, light to medium manufacturing/industrial facilities, and single-family homes to the south of the Base.

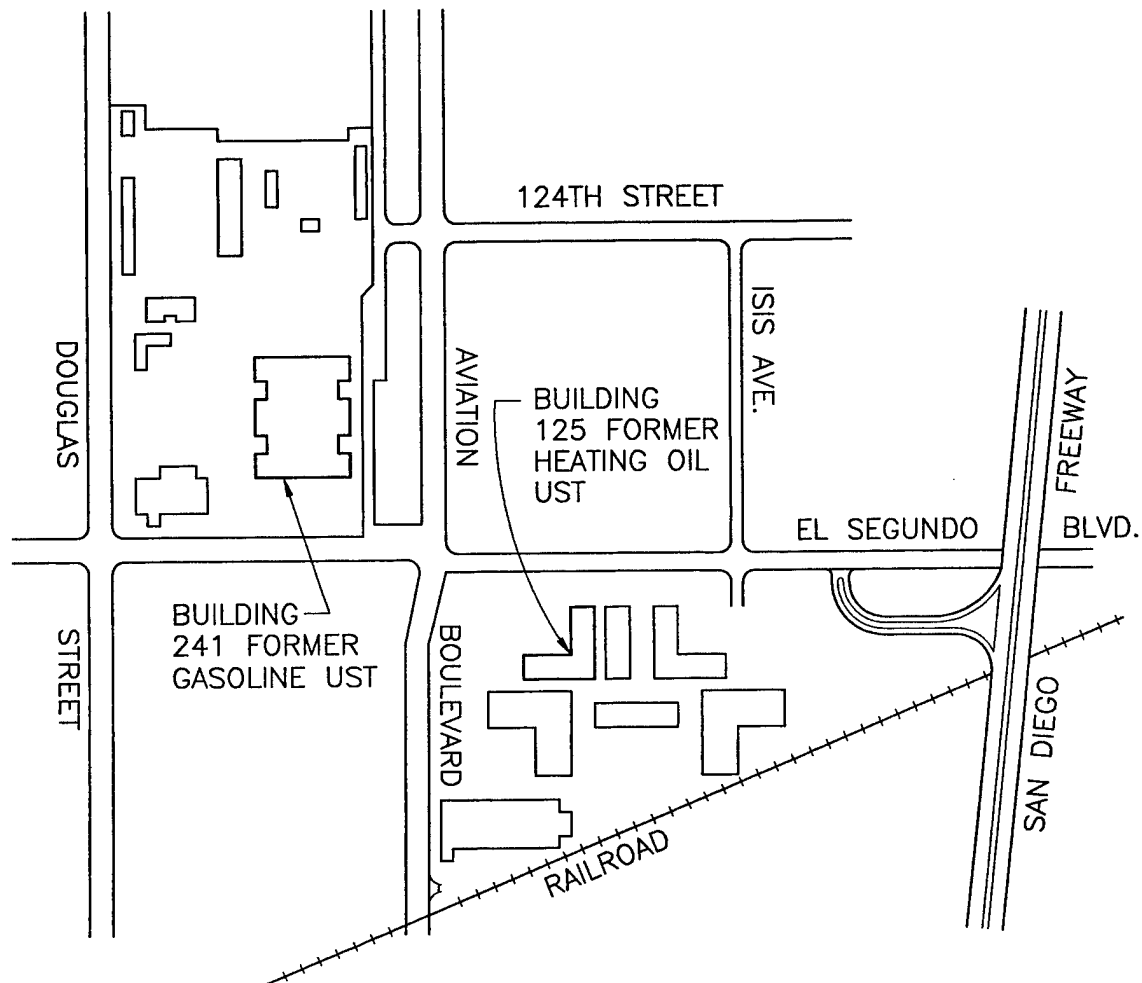
LA AFB is the space and missile center for the U.S. Air Force. Most of the facilities are office buildings, with some warehouse and maintenance shops, and a Base exchange center. The Base has no runway, aircraft, or related facilities. However, prior to becoming an Air Force base in the 1950s, defense contractors operated jet engine test facilities at the site.

2.1 BUILDING 241 FORMER GASOLINE UST SITE

Building 241, which houses a boiler facility, is currently active. The area surrounding the building is paved with concrete and asphalt. The site location is shown on Figure 2.1. The former 150-gallon gasoline UST is thought to have been installed in the mid-1950s. The tank was located immediately south of Building 241 (Figure 2.2). The UST was removed in August 1990 by TetraTech, Inc. (under LACDPW Hazardous Materials Division Closure Permit No. 7969, File No. I-10138-2C/15164-2N). The tank had visible signs of corrosion, and the fill pipe was disconnected from the tank (Mittelhauser Corporation, 1992a). Tank-bed soil samples collected during UST removal operations indicated the presence of total recoverable petroleum hydrocarbon (TRPH) contamination, and benzene, toluene, ethyl benzene, and xylene (BTEX) contamination. No additional excavation or investigation work was performed at that time. The excavation was backfilled with soil removed during the excavation, covered to grade with clean soil, and repaved with concrete.

2.2 BUILDING 125 FORMER HEATING OIL UST SITE

Building 125 is a restricted (security clearance required) office facility (Figure 2.1). The former 3,400-gallon heating oil UST was located under the asphalt parking lot adjacent to the perimeter planter, near the building entrance (Figure 2.3). Historic information for the tank is incomplete. It is believed that the tank was installed in the mid-1950s to 1960s. The tank was removed by TetraTech in early 1993. Because the tank did not contain motor vehicle fuel, the LACDPW did not issue a removal permit or file number. One of two tank-bed soil samples collected during removal operations was found to contain total petroleum hydrocarbons (TPH), TRPH, ethyl benzene, and xylene.



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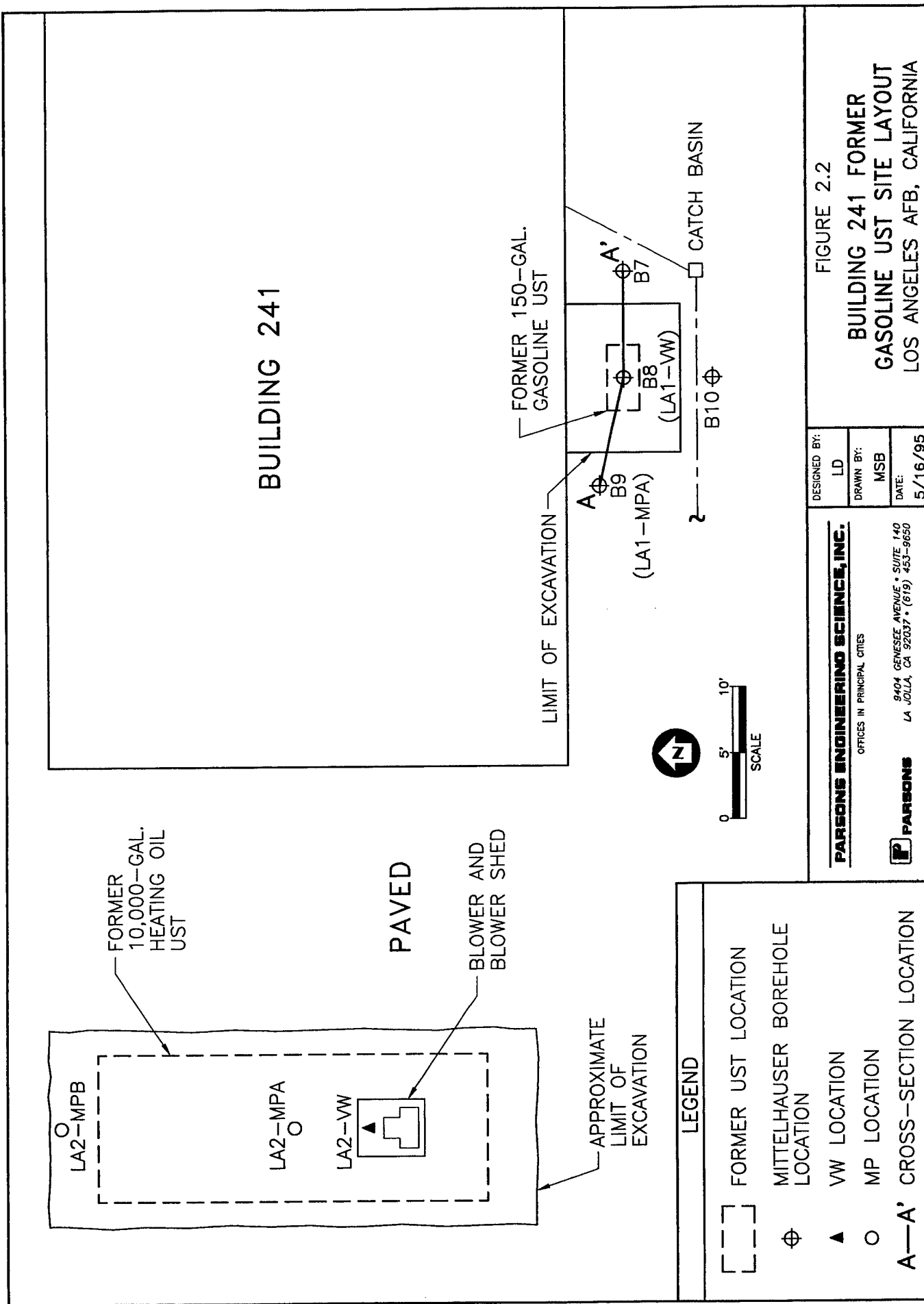
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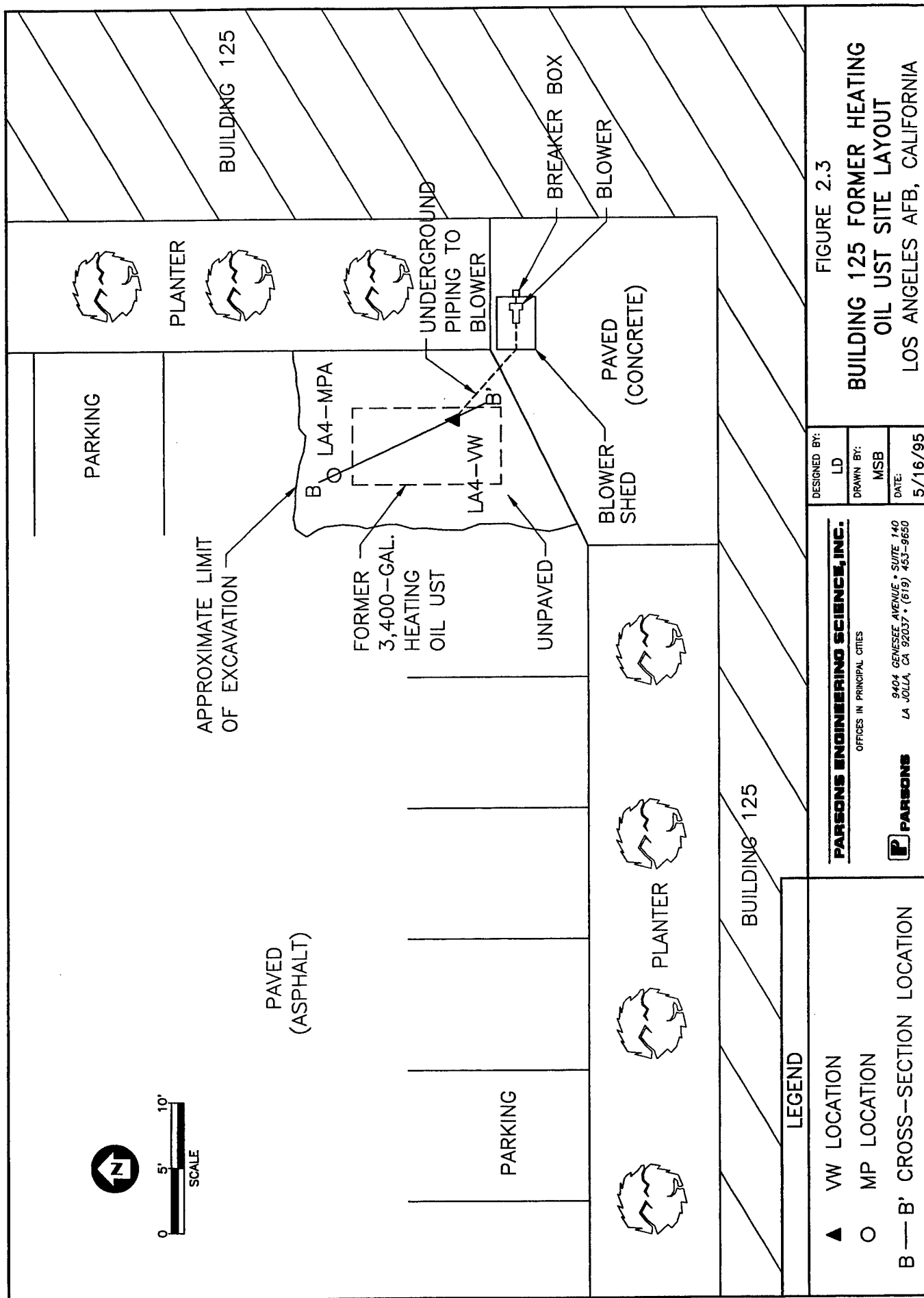
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FIGURE 2.1

SITE LOCATIONS

LOS ANGELES AFB, CALIFORNIA





July 5, 1995 - 20:46:38 D:\ACAD\726876\FIG2-3.DWG

2.3 SITE GEOLOGY

LA AFB is located in the western part of the Los Angeles Basin. The Los Angeles Basin is a relatively flat, low land area between the Santa Monica and San Gabriel Mountains to the north, and the Santa Ana Mountains to the south (TetraTech, 1992). The basin is filled with up to 20,000 feet of Miocene- to Recent-aged sediments.

Previous bioventing and site investigation activities have encountered four main soil units within the first 57 feet below ground surface (bgs). From just below paved surfaces to 10 to 12 feet bgs, a silty clay to clayey silt is encountered. This unit contains minor amounts of fine sand. From approximately 12 feet to 40 feet bgs is a well-sorted medium sand. Below this sand is a clay unit approximately 3 to 5 feet thick. A previous site investigation report describes this unit as being comprised of thin silt, sand, and clay subunits (TetraTech, 1992). Below this clay is another sand unit. This lower sand unit extends to at least 57 feet bgs.

2.4 SITE HYDROGEOLOGY

The depth to groundwater in well 1318N, located at the intersection of El Segundo and Nash, approximately 3,000 feet northwest of the sites, was measured at 96.5 feet on March 20, 1990. During previous Base investigations, boreholes to depths of 57 feet bgs did not encounter groundwater. According to Base sources, the depth to groundwater in two monitoring wells last sampled in the early 1990s was approximately 90 feet bgs. These wells will be located and sounded during closure sampling activities described in Section 4. The updated groundwater depth data will be included in the site closure report.

2.5 PREVIOUS INVESTIGATIONS AT BUILDING 241 FORMER GASOLINE UST SITE

2.5.1 UST Removal: 1990

This 150-gallon tank was excavated and removed in August 1990 by TetraTech, Inc. Information such as the number of samples collected, sample locations, analytical method detection limits, and specific compounds detected were not available from records supplied by LA AFB. The Base reported that one tank-bed sample had a TRPH concentration of 760 milligrams per kilogram (mg/kg) and a total BTEX concentration of 6 mg/kg. The specific BTEX compounds detected were not reported.

2.5.2 Soil Investigation: 1992

Additional site characterization work was performed by the Mittelhauser Corporation in July 1992. Mittelhauser drilled and sampled four boreholes in and around the former UST excavation. Results of the investigation are detailed in their October 1992 *UST Investigation Report, Los Angeles Air Force Base*. Mittelhauser borehole locations are shown on Figure 2.2. Soil sampling results are presented in Table 2.1. Only the sample from 6 feet bgs in the borehole drilled through the former tank bed (borehole B-8) had TPH as gasoline (TPH-g as analyzed using U.S. Environmental Protection Agency (EPA) SW8015 Modified) and BTEX (using

Table 2.1

**Soil Sample Analytical Results
Building 241 Former Gasoline UST Site
Los Angeles AFB, California**

Sample Number	Sample Depth (ft bgs) ^{c/}	TPH - Gas ^{a/} EPA SW8015 Mod. (mg/kg)	EPA SW8020 BTEX (mg/kg) ^{b/}			
			Benzene	Toluene	Ethyl Benzene	Xylenes
Detection Limits (mg/kg):						
B7-2	11	ND	0.005	0.005	0.005	0.01
B7-2D	11	ND	ND	ND	ND	ND
B7-3	16	ND	ND	ND	ND	ND
B7-4	21	ND	ND	ND	ND	ND
B8-1	6	1,850	6.24	31.8	18.7	91.4
B8-2	11	ND	ND	ND	ND	ND
B8-4	21	ND	ND	ND	ND	ND
B8-6	31	ND	ND	ND	ND	ND
B8-8	41	ND	ND	ND	ND	ND
B8-D	41	ND	ND	ND	ND	ND
B9-1	6	ND	ND	ND	ND	ND
B9-2	11	ND	ND	ND	ND	ND
B9-4	21	ND	ND	ND	ND	ND
B9-6	31	ND	ND	ND	ND	ND
B9-8	41	ND	ND	ND	ND	ND
B10-2	11	ND	ND	ND	ND	ND
B10-3	16	ND	ND	ND	ND	ND
B10-4	21	ND	ND	ND	ND	ND

Source: Mittelhauser, 1992.

^{a/} TPH = total petroleum hydrocarbons - gasoline range; EPA = US Environmental Protection Agency.^{b/} BTEX = benzene, toluene, ethyl benzene, and xylenes; mg/kg = milligrams per kilogram.^{c/} ft bgs = feet below ground surface.

EPA Method SW8020) concentrations above detection limits. This sample had a TPH-g concentration of 1,850 mg/kg, and BTEX concentrations of 6.24 mg/kg, 31.8 mg/kg, 18.7 mg/kg, and 91.4 mg/kg, respectively (Table 2.1).

2.5.3 Bioventing: 1992-1995

During the 1992 Mittelhauser investigation, Parsons ES installed a bioventing air injection vent well (VW) and a vapor monitoring probe (MP) in boreholes B-8 and B-9, respectively. VW and MP locations and construction are shown in cross section on Figure 2.4. However, as described in the Parsons ES (1994) *Draft Bioventing Pilot Test Interim Results Report*, initial soil gas testing at the VW and MP indicated sufficient oxygen concentrations (>5 percent) to facilitate naturally occurring bioremediation. Therefore, the air injection blower originally planned for the VW was not installed.

Beginning in July 1993, Parsons ES conducted a bioventing pilot test at the nearby Building 241 former 10,000-gallon heating oil UST, located approximately 67 feet from the former gasoline UST (Figure 2.2). A VW and three MPs were installed at the former heating oil UST (Parsons ES, 1994). As part of the pilot test, an air permeability test and a respiration test were conducted at the former heating oil UST site. Air permeability testing indicated the former heating oil UST VW's zone of pressure and oxygen influence included the former gasoline UST area. The respiration test indicated hydrocarbon biodegradation rates of up to 2,800 mg of hydrocarbons per kg of soil per year in the more contaminated soil at the site.

Because of the relatively low initial TPH-g and BTEX concentrations at the former gasoline UST, and the beneficial effect of the nearby bioventing system, it is expected that the former gasoline UST site has been remediated to within regulatory cleanup levels. It is anticipated that TPH-g concentrations are at or below 100 mg/kg, and that BTEX concentrations are below detection limits. Therefore, it is anticipated that the results of the site closure soil sampling described in Section 4 will support site closure.

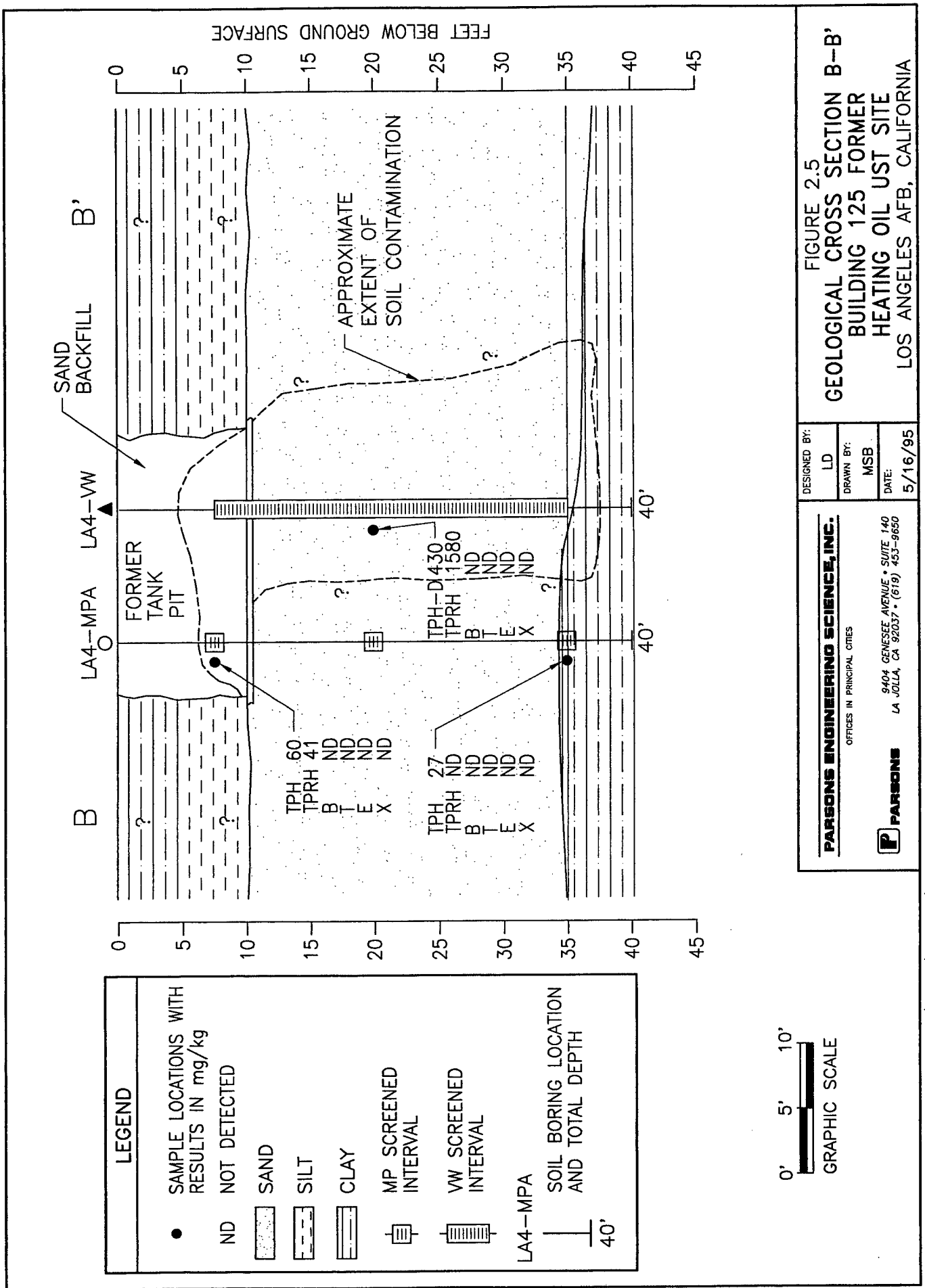
2.6 PREVIOUS INVESTIGATIONS AT BUILDING 125 FORMER HEATING OIL UST SITE

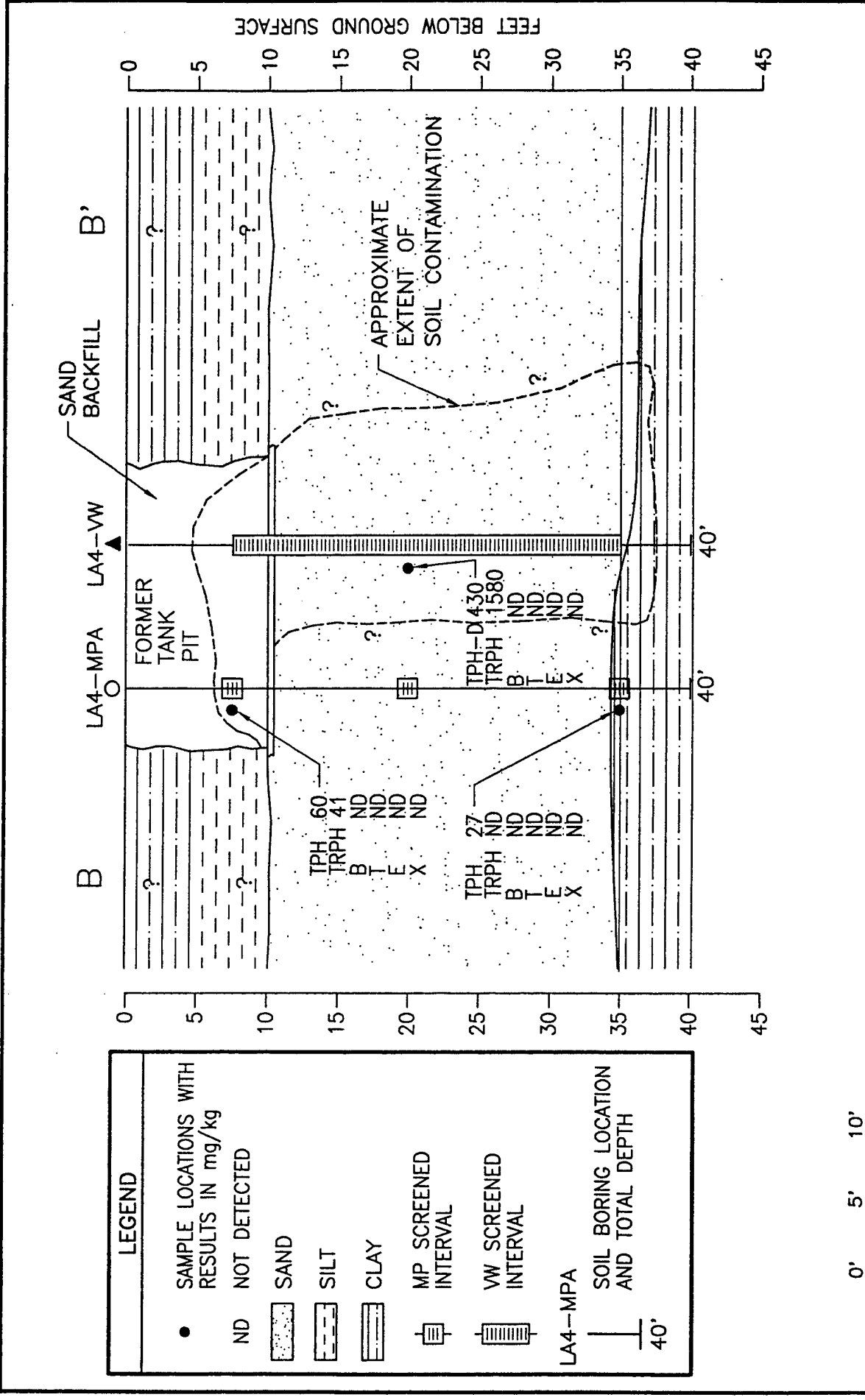
2.6.1 UST Removal: 1993

The 3,400-gallon heating oil UST was removed in early 1993. Information provided by LA AFB (Michael Hanna) indicated one of the two tank-bed samples collected during removal operations had elevated TPH-d (EPA Method SW8015 Modified for diesel-range organics), TRPH, ethyl benzene, and xylene concentrations of 1,600 mg/kg, 4,300 mg/kg, 82 mg/kg, and 180 mg/kg, respectively.

2.6.2 Bioventing: 1993-1994

Beginning in July 1993, Parsons ES conducted bioventing pilot testing activities at the site of the former heating oil UST. As part of the pilot test, one VW and one MP were installed at the site. VW and MP locations are shown on Figures 2.3 and in cross section on Figure 2.5. Because the project focus was on bioventing, not site





characterization, only limited soil sampling was performed. Three soil samples were collected from the VW and MP, and a soil gas sample was collected from the VW. Analytical results are presented in Table 2.2. Detailed pilot testing procedures and results are presented in the bioventing report (Parsons ES, 1994). Initial testing indicated that site contamination extended from directly beneath the former UST to approximately 35 feet bgs, at which depth a clay layer was encountered. MPA, located 10 feet from the VW, had only moderate field evidence of contamination in one sample collected from tank-bed backfill material. A respiration test conducted in the VW indicated a hydrocarbon reduction rate of approximately 1,380 mg of hydrocarbons per kg of soil per year. The air permeability test indicated that a 2.3-cubic-foot-per-minute air injection pump would provide sufficient oxygen to treat the area of contamination as defined during the pilot test.

Long-term air injection at the Building 125 former heating oil UST site began in December 1993 and continued until December 1994. Year-end sampling completed in January 1995 indicated a 99.9 percent reduction in TVH in the soil gas sample and TRPH reductions of 83 percent and 57 percent in two of the three soil samples (Table 2.2). The year-end respiration test indicated a hydrocarbon biodegradation rate of approximately 1,000 mg/kg per year. Following year-end testing, the blower was reinstalled and is currently injecting air into the VW. Based on the encouraging year-end sampling and testing results, it is anticipated that site TRPH concentrations are below 1,000 mg/kg, and the BTEX concentrations are below detection limits. It is also anticipated that results of the site closure soil sampling described in Section 4 will support site closure.

Table 2.2

**Soil and Soil Gas Sample Analytical Results
Building 125 Former Heating Oil UST Site
Los Angeles AFB, California**

Analyte (Units) ^{a/}		Sample Location - Depth (Feet Below Ground Surface)	
		Initial LA4-VW	Year-end LA4-VW
Soil Gas Hydrocarbons			
TVH ^{b/} (ppmv)		2,200	.7
Benzene (ppmv)		ND (0.051) ^{c/}	ND (0.002)
Toluene (ppmv)		ND (0.051)	ND (0.002)
Ethyl benzene (ppmv)		0.089	ND (0.002)
Xylenes (ppmv)		0.20	0.015

	Initial LA4-VW-20'	Year-end LA4-VW-20'	Initial LA4-MPA-7'	Year-end LA4-MPA-7'	Initial LA4-MPA-35'	Year-end LA4-MPA-35'
Soil Hydrocarbons						
TPH-D ^{d/} (mg/kg)	430	NA ^{e/}	60	NA	27	NA
TRPH ^{f/}	1,580	274	41	17.8	ND (11)	34.9
Benzene (mg/kg)	ND (0.002)	ND (0.05)	ND (0.0003)	ND (0.05)	ND (0.0003)	ND (0.05)
Toluene (mg/kg)	ND (0.002)	ND (0.05)	ND (0.0003)	ND (0.05)	ND (0.0003)	ND (0.05)
Ethyl benzene (mg/kg)	ND (0.002)	ND (0.05)	ND (0.0003)	ND (0.05)	ND (0.0003)	ND (0.05)
Xylenes (mg/kg)	ND (0.004)	ND (0.10)	ND (0.0007)	ND (0.10)	ND (0.0007)	ND (0.10)

Source: Parsons ES, 1994

- a/ ppmv = parts per million, volume per volume; mg/kg = milligrams per kilogram
b/ TVH = total volatile hydrocarbons referenced to jet fuel (Molecular weight = 156).
c/ ND = Not detected, detection limit given in parentheses.
d/ TPH-D = total petroleum hydrocarbons as diesel fuel by EPA SW8015 Modified.
e/ NA = Not analyzed.
f/ TRPH = total recoverable petroleum hydrocarbons by EPA 418.1.

SECTION 3

SITE CLOSURE REQUIREMENTS

In February 1995 the California RWQCB, Los Angeles Region, released its Interim Site Assessment and Cleanup Guidebook. Site assessment and cleanup guidance is included in Volume I of the guidebook. The guidebook sets specific numerical cleanup goals based on type of contaminant, depth to ground water and potential use of ground water (i.e. drinking water).

3.1 SITE CHARACTERIZATION REQUIREMENTS

Specific requirements such as sampling protocol, sample depths and analytical methods are not included in the guidebook. However, the California RWQCB requires development of a Site Assessment Work Plan where site specific activities are described.

The work plan is submitted for approval before field work begins. Based on the results of implementing the work plan, a corrective action plan is developed.

Because the plans described above were not developed for this project, the California RWQCB, Los Angeles Region, was contacted in May 1995. The characterization activities completed at the Building 241 Former Gasoline UST Site and by Mittelhauser in 1992 and the sampling planned for the Building 125 Former Heating Oil UST Site (described in Section 4) were explained to the agency. The RWQCB gave tentative approval to go ahead with closure sampling activities (pending approval of this plan).

3.2 STATE SOIL CLEANUP STANDARDS

Soil cleanup standards for petroleum-impacted sites are presented in Section 5 of the guidebook and in Table 3.1. Depth to groundwater at the LA AFB is approximately 90 feet bgs and is considered to be drinking water by the California RWQCB. Therefore, Level B cleanup standards apply to both sites.

Table 3.1
California Regional Water Quality Control Board
Soil Cleanup Standards
(mg/kg or ppm)

	Distance Above Groundwater (ft)		
	< 40	40-150	> 150
ABOVE DRINKING WATER	LEVEL A	LEVEL B	LEVEL C
BTEX + FA	MCL	10 MCL	100 MCL
TPH (Carbon Range)			
C4 - C12	10	100	1000
C13 - C22	100	1000	10000
C23 +	1000	10000	10000
ABOVE NON-DRINKING WATER	LEVEL D (FOR ANY DEPTH TO GROUNDWATER)		
BTEX + FA	100 MCL		
TPH (Carbon Range)			
C4 - C12	1000		
C13 - C22	10000		
C23 +	15000		

Source: RWQCB, 1995.

MCLS: B = 0.001 (ppm), T = 0.1 (ppm), E = 0.68 (ppm), X = 1.75 (ppm), Pb = 0.015 (ppm), EDB + 0.02 (ppb), PAH = 0.2 (ppb)

- BTEX = Benzene, toluene, ethyl benzene, and xylenes, respectively.
TPH = Total petroleum hydrocarbons.
FA = Fuel additives, lead (Pb), ethylene dibromide (EDB), etc., including other components (i.e., PAH) of petroleum products which have MCLs.
- Use of this table assumes the original source has been removed and an adequate site assessment has been completed.
- For BTEX or FA, each component is not to exceed 1, 10, or 100 times its MCL as specified.
- For TPH, the total allowable for each range is not to be exceeded and the overall total is not to exceed the given value for the heavier TPH (C23+).
- Soil levels below the appropriate levels in this table require no action, soil levels above the appropriate levels in this table must be remediated to or below provided levels, or a site-specific analysis must be conducted, or justification provided to determine more appropriate levels for an individual site. Groundwater monitoring may be required if soil contamination linkage to groundwater impact has been confirmed.
- BTEX to be analyzed by EPA Method 8020, or EPA Method 8260 (usually to confirm positive benzene).
- TPH to be analyzed by EPA Methods 418.1 and 8015 (Modified). Ranges of TPH to be analyzed by GC/MS carbon range methods or EPA Method 8015 (DHS Modified). PAH to be analyzed by EPA Method 8310.
- Use of Non-Drinking Water Levels are dictated by either water characteristics as defined and exempted under SWRCB Resolution 88-63 (TDS > 3000 mg/L, deliverability < 200 gal/day, or existing contamination that cannot be reasonably treated), or as agreed upon by Regional Board staff for use at a particular site.
- Minimum clean interval below impacted area to be determined on a site-specific basis by Regional Board staff, generally 40' above drinking waters and 20' above non-drinking waters.

SECTION 4

SITE CLOSURE SAMPLING AND ANALYSIS PLAN

The following SAP describes the borehole locations and sampling depths, soil sampling procedures, and analytical methods proposed to collect sufficient data to support site closure. This plan has been prepared and will be implemented by, or under the direct supervision of, a California Registered Geologist as required by the California RWQCB (1995) Interim Site Assessment and Clean-up Guidebook (see Section 3).

4.1 SITE CLOSURE BOREHOLE LOCATIONS AND SAMPLING DEPTHS

4.1.1 Building 241 Former Gasoline UST Site

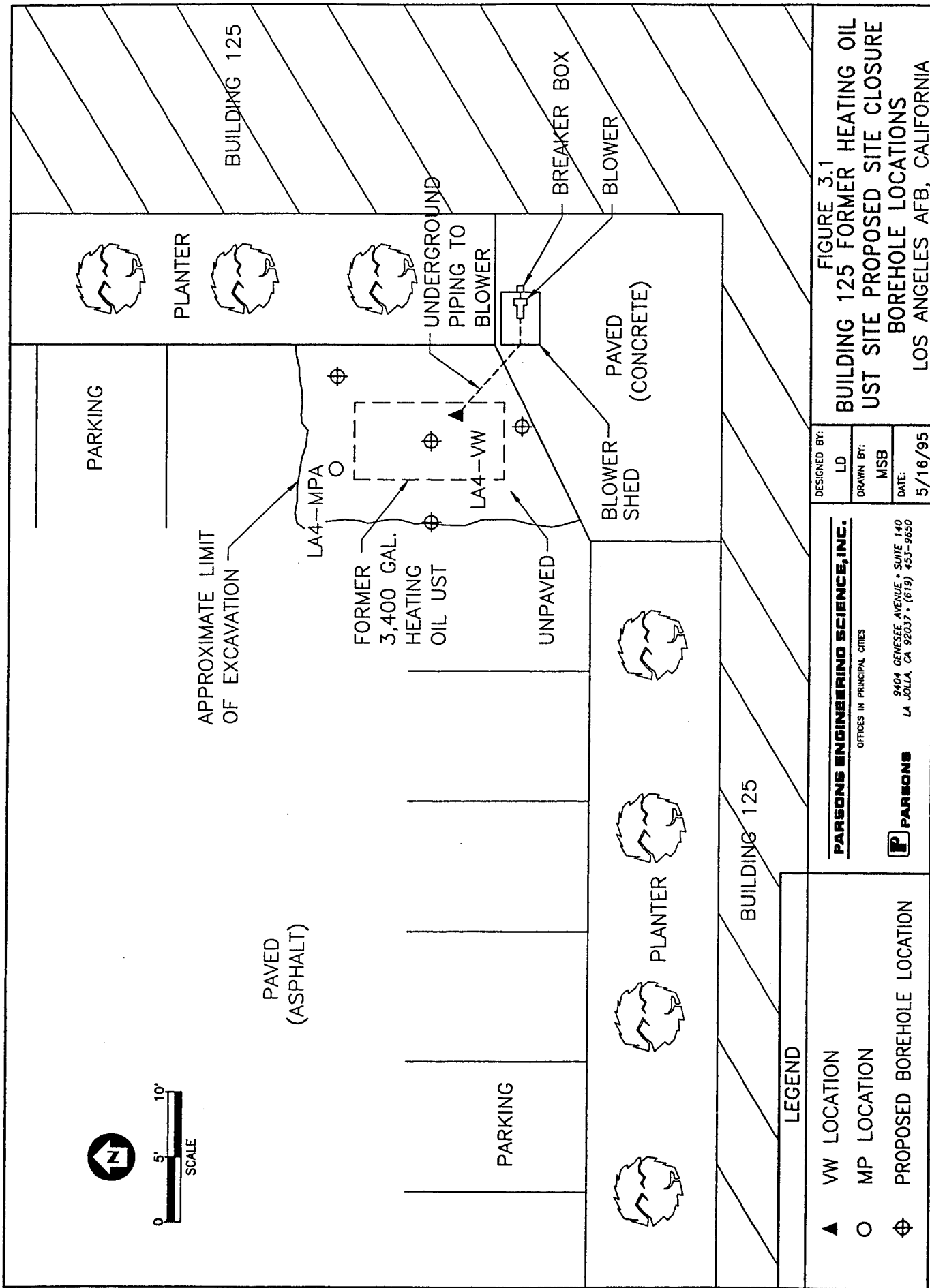
As described in Section 2, this site was adequately characterized during the 1992 Mittelhauser investigation. Soil contamination was limited to the immediate vicinity of the former tank at 6 feet bgs. Parsons ES proposes to drill an additional borehole through the center of the former tank bed, approximately 1 to 2 feet from the VW (B8) (see Figure 2.2). Soil samples for laboratory analysis will be collected at 4, 6, and 8 feet bgs. If the 8-foot sample has any field evidence of contamination (e.g., odor, staining, or above-background photoionization detector (PID) and total hydrocarbon vapor analyzer (THVA) readings) additional samples will be collected at 2-foot intervals until field evidence of contamination is not detectable. Soil samples will be collected and analyzed as described in Subsections 4.2 and 4.3, respectively.

In the unlikely event that analytical results indicate additional site remediation is required, the VW and MP will not be abandoned at this time. Should site closure be granted, arrangements will be made to properly abandon the VW and MP.

4.1.2 Building 125 Former Heating Oil UST Site

To confirm that the extent of site contamination has been adequately characterized and remediated to within acceptable levels, Parsons ES proposes to drill and sample four additional boreholes. Proposed borehole locations are shown on Figure 4.1. To establish the maximum depth of contamination, the first borehole will be drilled through the center of the former tank bed. Samples for chemical analysis will be collected at 5-foot intervals, from 5 feet bgs to a minimum of 40 feet bgs, approximately 3 feet into the clay (see Figure 2.5). If the 40-foot sample has field evidence of contamination, sampling will continue at 5-foot intervals until such field evidence is no longer present.

The remaining boreholes will be drilled and sampled at 5-foot intervals to the same depth as the first borehole. In these three boreholes, only samples with field evidence of contamination will be retained for laboratory analysis. To confirm



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non-detect field screening results, at least four samples from each borehole, including the deepest sample, will be retained for laboratory analysis. Soil samples will be collected and analyzed as described in Subsections 4.2 and 4.3, respectively.

In the unlikely event that analytical results indicate additional site remediation is required, the VW and MP will not be abandoned at this time. Should site closure be granted, arrangements will be made to properly abandon the VW and MP.

4.2 DRILLING, SAMPLING, AND EQUIPMENT DECONTAMINATION

Boreholes will be advanced using a drill rig equipped with 6-inch outside-diameter (OD) hollow-stem augers. Soil cuttings generated during drilling will be placed in US Department of Transportation (DOT)-approved, 55-gallon drums. The drums will be labeled with the site name, drilling date, borehole number, and depth intervals. To minimize cuttings disposal costs, cuttings showing no field evidence of contamination will not be drummed with contaminated cuttings (i.e., soil with above-background PID and TVHA readings, petroleum odor, or discoloration). Boreholes will be logged by a Parsons ES geologist. Soil types will be classified according to the Unified Soil Classification System (USCS) and described in accordance with the standard Parsons ES soil description format.

Before use and between boreholes, augers and other downhole equipment will be cleaned to prevent cross-contamination. Cleaning will be accomplished using a high-pressure hot-water wash, followed by a potable water rinse. Decontamination fluids will be collected and contained in labeled 55-gallon drums.

Relatively undisturbed soil samples, suitable for chemical analysis, will be collected at approximately 2- to 5-foot intervals unless specified otherwise. Soil samples will be collected in a 2.5-inch inside-diameter (ID) split-barrel sampler that will be lowered through the hollow stem of the augers and driven approximately 1.5 foot (or to refusal, if shallower) into undisturbed soil, ahead of the augers. Between sampling events, the split-barrel sampler will be cleaned with Alconox® detergent, followed by successive potable and distilled water rinses.

The split-sampler will be fitted with three precleaned, 2.5-inch OD by 6-inch-long, thin-walled, brass sleeves. Before samples are collected, sample sleeves will be cleaned using the same procedure as that for the sampler. After collection of a sample, the sampler will be retrieved, split apart, and the sleeves will be removed. The ends of the lowest sleeve that contains the sample for chemical analysis will be covered with Teflon® sheets and plastic end caps.

The upper sample sleeves will be used for logging purposes, and will be screened in the field for organic vapors using a PID and a TVHA. The data obtained from the logging and screening will be recorded on the borehole logs.

The sleeves for chemical analysis will be labeled with the site name and borehole number, sample depth, date of collection, project name, and other pertinent data. These sleeves will be placed immediately in an insulated shipping container with ice, and will be maintained in a chilled condition until delivered to the analytical laboratory. Chain-of-custody records will be prepared in the field and will accompany the samples to the analytical laboratory.

4.3 SOIL SAMPLE ANALYSIS

Proposed sample analytical methods and detection limits are presented in Table 4.1. All samples will be analyzed by a State of California-certified and AFCEE-approved Laboratory.

Parsons ES proposes to analyze samples from the Building 241 former gasoline UST site by EPA Method SW8015 Modified for TPH as gasoline, by EPA Method 7421 for lead, and by EPA Method SW8020 for BTEX. Proposed analyses for the Building 125 former heating oil site will include EPA Method 418.1 for TRPH, EPA Method SW8015 Modified for TPH (as extractable fuels), and EPA Method SW8020. TPH results for both sites will be reported for each carbon chain (i.e., C4-C23+). This will allow for comparison with greater accuracy to California RWQCB (1995) clean-up standards listed in the *Interim Guidance For Remediation of Petroleum Impacted Sites* (see Subsection 3.2).

Table 4.1
Proposed Soil Sample Analytical Methods and
Practical Quantitation Limits

Analytical Method	PQL (mg/kg)^{a/}
Building 241 Former Gasoline UST Site	
EPA SW8015 Modified for Gasoline ^{b/} (California Department of Health Services Method)	1.0
EPA 7421 for Lead	1.5
EPA SW8020	
Benzene	0.001
Toluene	0.005
Ethyl benzene	0.005
Xylenes	0.05
Building 125 Former Heating Oil UST Site	
EPA 418.1 TRPH	5.0
EPA SW8015 Modified for Extractable Fuels ^{b/}	5.0
EPA SW8020	
Benzene	0.001
Toluene	0.005
Ethyl benzene	0.005
Xylenes	0.05

^{a/} PQL = practical quantitation limit; mg/kg = milligrams per kilogram

^{b/} Results will be reported for each carbon chain using the simulated distillation method.

SECTION 5

SITE CLOSURE REPORT FORMAT

Following receipt of the laboratory analytical results, a site closure report will be prepared and submitted to the California RWQCB, LA AFB, and AFCEE.

The report will contain the following information for each site:

- Plot plans showing final borehole locations;
- Summary of field activities;
- Assessment of analytical results in comparison to state cleanup criteria;
- Laboratory analytical reports and chain-of-custody forms;
- Borehole logs; and
- Conclusions and recommendations for site closure or additional cleanup action.

The report will be prepared and signed by a California Registered Geologist.

SECTION 6

REFERENCES CITED

- California Regional Water Quality Control Board, Los Angeles Region, (RWQCB). 1995. *Interim Site Assessment and Clean-up Guidebook*. Vol I. February.
- Mittelhauser Corporation. 1992a. *UST Investigation Report*. Prepared for U.S. Army Corps of Engineers, Los Angeles Air Force Base. October.
- _____. 1992b. *Air Force Base UST Investigation Work Plan*. Prepared for U.S. Army Corps of Engineers, Los Angeles Air Force Base. January.
- Parsons Engineering Science, Inc. 1994. *Draft Bioventing Pilot Test Interim Results Report for Building 241, Gate 3, and Building 125 Heating Oil UST Sites*. Prepared for Air Force Center for Environmental Excellence. January.
- TetraTech, Inc. 1992. *Remediation Investigation and Feasibility Study, Building 235 Service Station, Los Angeles Air Force Base*. September.

APPENDIX B

BOREHOLE LOGS

Geologic Borehole and Well Completion Log

726876.25223

Date	01/16/96	ESTDATE	ESCI	ESCCODE	Los Angeles AFB Closure Sampling	
Northing	0.00 ft. NCOORD		TEDS	DRLCODE	Air Force Installation	AFIID
Easting	0.00 ft. ECOORD			B61	Location Identification	LOCID
Borehole Total Depth	9.50 ft. DEPTH		Drill Rig Type	DRLEQP		
			Construction Method	HS	241CB1	

Completion	Sampling			Depth feet	Lithology			Remarks
	Instrument Reading	SBD	SMCODE		USCS Unified Soil Classification System	Lithologic Symbols & Codes	Description	
Elevation feet MSL 0.00	Penetration	SED	REC%		ASTMCODE	LITHCODE	SOIL/ROCK TYPE, modifiers/grain size, sorting, color, cement/lithification, moisture content, porosity, permeability/fracturing. -Initials	Depth Borehole Diameter Drilling Problems Weather
							backfill, pea gravel and sand -LAD	0.00' no odor -LAD
	PID 115.50 PPM 6/9/11	4.00	SS		GM		SILT and CLAY, dark brown and very dark grey (7.5YR4/2 & 7.5YR3/3), plastic, wet -LAD	4.00' strong weathered petroleum odor -LAD
	PID 0.00 PPM 8/15/25	5.50	SS		ML		SILT, dark brown (10YR4/3), moderately plastic, moist -LAD	6.00' no odor -LAD
	PID 9.40 PPM 7/16/15	7.50	SS				SILT, dark brown (10YR4/3), slightly plastic, slightly damp -LAD	8.00' no odor -LAD

LOSAN 241CB1 TD 9.50' 1"=5.00' 1:60.00 960517 1023 Sheet 1 of 1

241CB1

Geologic Borehole and Well Completion Log

Geologic Borehole and Well Completion Log

726876.25223

Date 01/16/96	ESTDATE	Establishing Company ESCI	ESCCODE	Los Angeles AFB Closure Sampling	AFID
North 0.00 ft. NCOORD		Drilling Company TEDS	DRLCODE	Air Force Installation	LOSAN
East 0.00 ft. ECOORD		Drill Rig Type B61	DRLQOP	Location Identification	125CB1
Borehole Total Depth 45.50 ft. DEPTH		Construction Method HS	CMCODE		LOCID

Completion Elevation feet MSL	Sampling			Depth feet	USCS Unified Soil Classification System	ASTM CODE	Lithologic Symbols & Codes	Lithology		Remarks
	Instrument Reading	SBD ft.	SEC ft.					Description	STRATORDER	
0.00								SOIL/ROCK TYPE, modifiers/grain size, sorting, color, cement/lithification, moisture content, porosity, permeability/fracturing, -Initials		Depth Borehole Diameter Drilling Problems Weather Time Equipment Water Level -Initials
								SAND -LAD		0.00' no odor -LAD
	PID 0.00 PPM 6/12/19	4.00 SS	5.50	5	SP			SAND, dark brown (10YR3/3), medium, moist -LAD		4.00' no odor -LAD
	PID 0.00 PPM 9/14/18	9.00 SS	10.50	10	SM			SAND, dark brown (10YR3/3), medium, some silt, plastic, wet -LAD	2	9.00' no odor -LAD
	PID 0.00 PPM 8/9/12	14.00 SS	15.50	15				SAND, dark yellowish brown (10YR4/6), medium, damp, non-plastic -LAD	2	14.00' no odor -LAD
	PID 0.00 PPM 12/18/22	19.00 SS	20.50	20	SP			SAND, dark yellowish brown (10YR4/6), fine to medium, damp, non-plastic -LAD	2	19.00' no odor -LAD

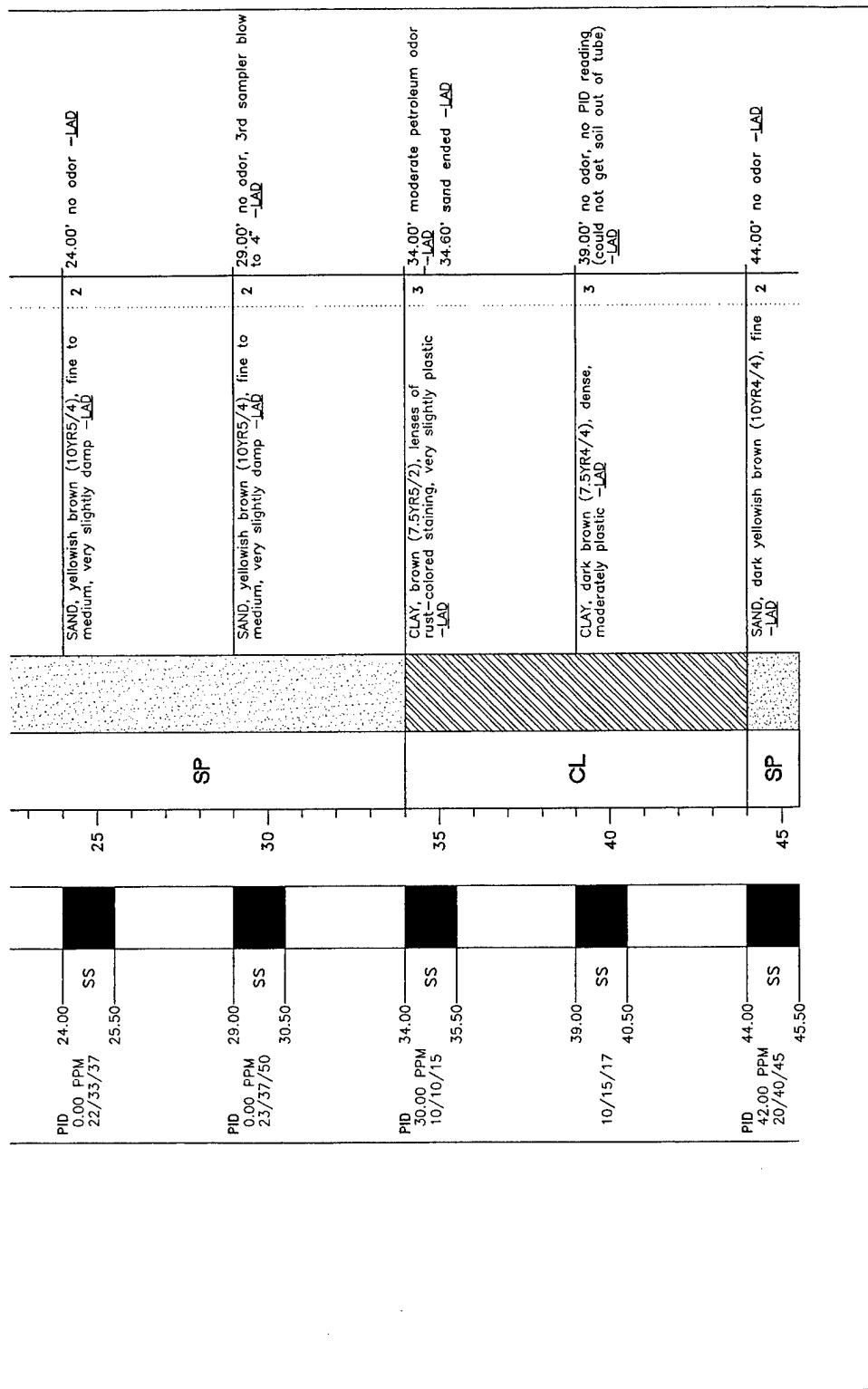
LOSAN 125CB1 TD 45.50' 1"=4.50' 1:54.00 960517 1020 Sheet 1 of 2

125CB1

Geologic Borehole and Well Completion Log



**PARSONS
ENGINEERING SCIENCE, INC.**
San Diego, CA (619) 453-9650



LOSAN 125CB1 TD 45.50' 1"=4.50' 1:54.00 960517 1020 Sheet 2 of 2

125CB1
Geologic Borehole and Well Completion Log (continued)

Geologic Borehole and Well Completion Log

726876.25223

Date 01/16/96	ESTDATE 0.00 ft. NCOORD 0.00 ft. ECOORD 46.50 ft. DEPTH	Establishing Company Drilling Company Drill Rig Type Construction Method	ESCI TEDS B61 HS	ESCCODE DRLCODE DRLRUP CMCCODE	Los Angeles AFB Closure Sampling Air Force Installation Location Identification	AFIID 125CB2 LOCID
------------------	--	---	---------------------------	---	---	--------------------------

Completion	Sampling		Depth feet	Lithology			Remarks
	Instrument Reading Penetration	SBD SMCODE SED		USCS Unified Soil Classification System ASTM CODE	Lithologic Symbols & Codes LITHCODE	Description SOIL/ROCK TYPE, modifiers/grain size, sorting, color, cement/lithification, moisture content, porosity, permeability/fracturing. -Initials	
Elevation feet MSL 0.00							
	PID 0.40 PPM 5/6/6	4.00 SS 5.50		SP		SAND -LAD	0.00' no odor, plastic sheeting in cuttings -LAD
			5				
			10				
	PID 0.20 PPM 10/12/12	12.50 SS 14.00		SM		SAND, dark brown (10YR4/4), fine to medium, some silt, moist -LAD	4.00' no odor -LAD
							10.00' 13" thick concrete slab -LAD
	PID 0.00 PPM	15.00 SS 16.50				SAND, yellowish brown (10YR5/4), fine to medium, slightly damp -LAD	12.50' no odor -LAD
			15				
							15.00' no odor -LAD
	PID 0.00 PPM 14/25/30	20.00 SS 21.50		SP		SAND, fine to medium -LAD	20.00' no odor -LAD
			20				
			25				

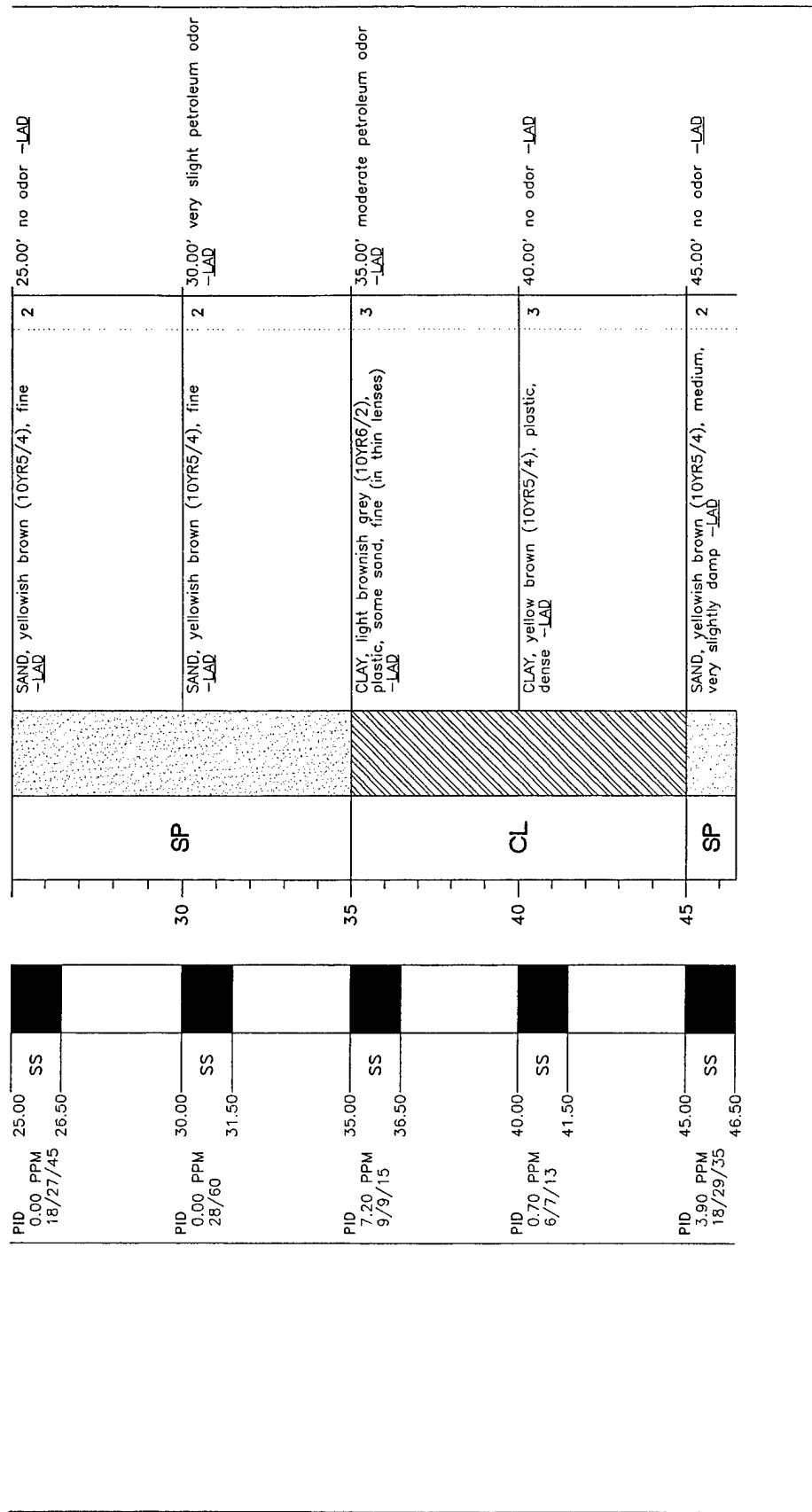
125CB2

Geologic Borehole and Well Completion Log

LOSAN 125CB2 TD 46.50' 1"=5.00' 1:60.00 960517 1021 Sheet 1 of 2



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San Diego, CA (619) 453-9650



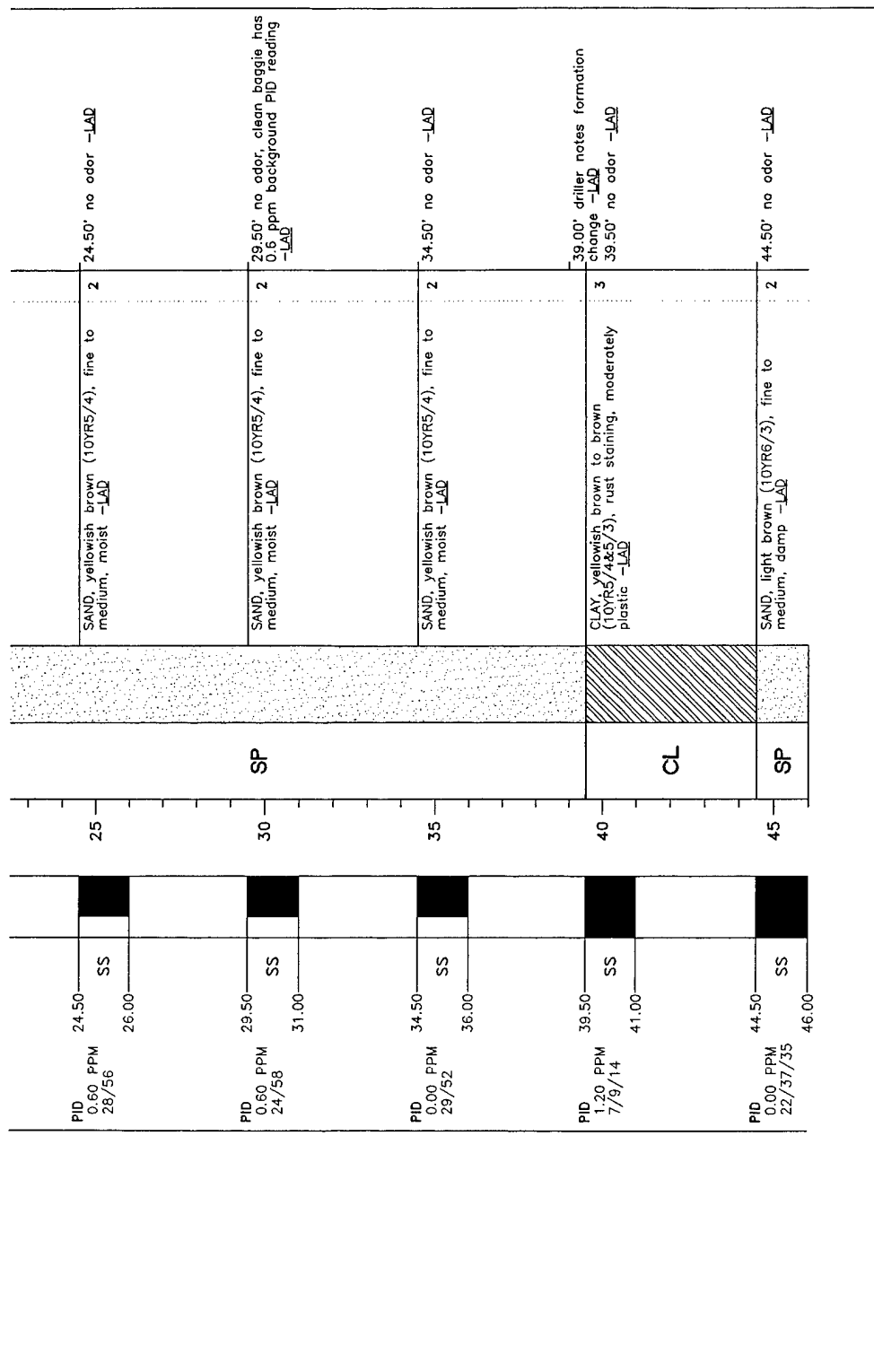
125CB2
Geologic Borehole and Well Completion Log (continued)

726876.25223

LOSAN 125CB3 TD 46.00' 1"=4.50' 1:54.00 960517 1022 Sheet 1 of 2

Geologic Borehole and Well Completion Log





LOSAN 125CB3 TD 46.00' 1"=4.50' 1:54.00 960517 1022 Sheet 2 of 2

125CB3
 Geologic Borehole and Well Completion Log (continued)

Geologic Borehole and Well Completion Log

726876.25223

Date		01/17/96		ESTDATE		Establishing Company		ESCI		ESCODE		Los Angeles AFB Closure Sampling		AFID		LOCID			
Northing		0.00		ft. NCOORD		Drilling Company		TEDS		DRLCODE		Air Force Installation		LOSAN					
Easting		0.00		ft. ECOORD		Drill Rig Type		B61		DRLEQP		Location Identification		125CB4					
Borehole Total Depth		46.00		ft. DEPTH		Construction Method		HS		CMCODE									
Completion		Elevation feet MSL		0.00		Sampling		Depth feet		USCS Unified Soil Classification System		Lithologic Symbols & Codes		LITHCODE		Lithology Description		Remarks	
		Instrument Reading Penetration		SBD SMCODE SED		SS		REC%		ASTMCODE									
		PID 0.50 FPM 6/10/10		4.50		SS		6.00		SP								0.00' no odor -LAD	
		PID 0.00 FPM 6/9/13		9.50		SS		11.00		ML								4.50' no odor -LAD	
		PID 0.40 FPM 9/11/13		14.50		SS		16.00										9.50' no odor -LAD	
		PID 1.20 FPM 10/17/27		19.50		SS		21.00		SP								14.50' no odor -LAD	
																		19.50' no odor -LAD	

LOSAN 125CB4 TD 46.00' 1"=4.50' 1:54.00 960517 1023 Sheet 1 of 2

125CB4

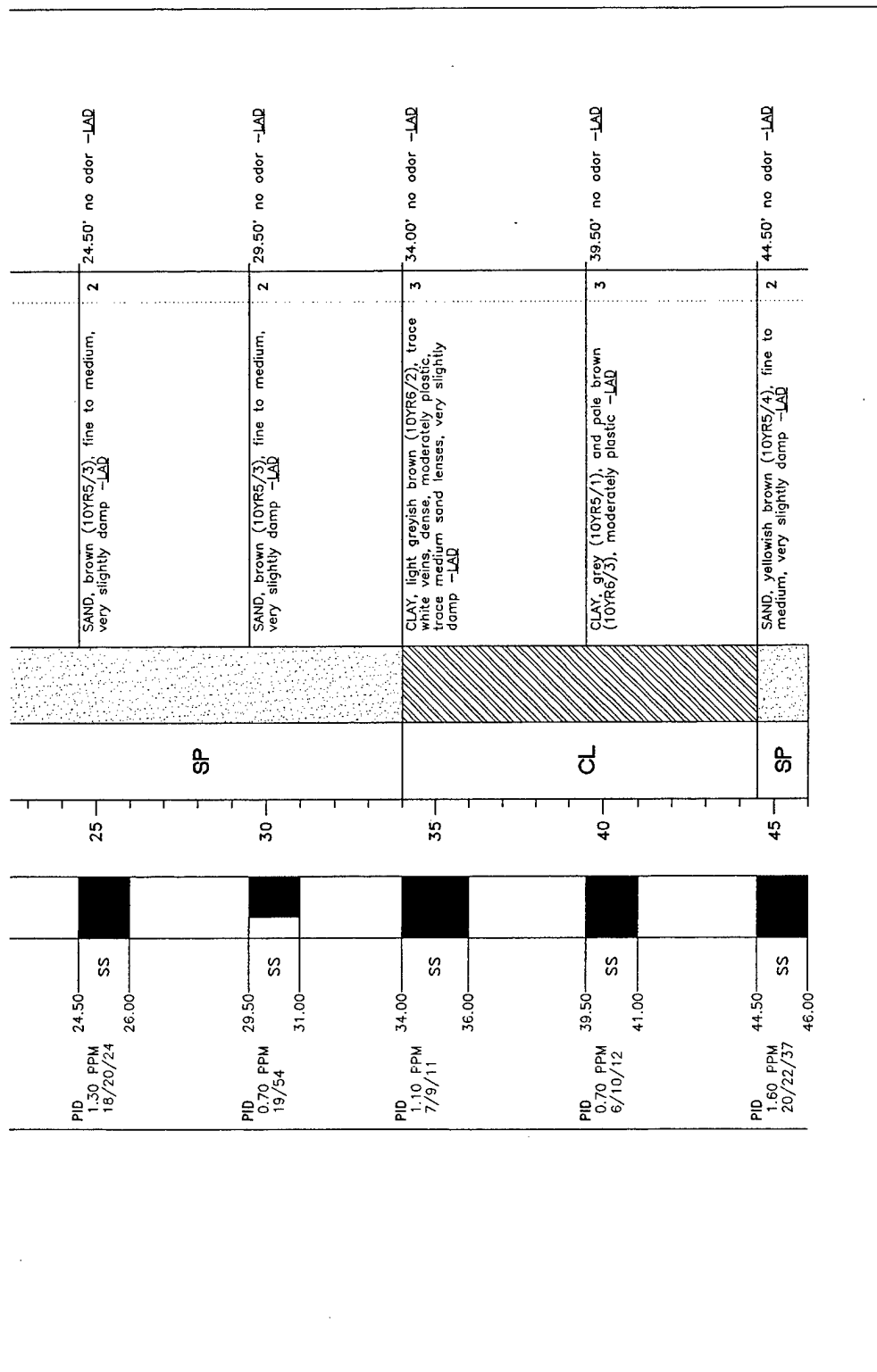
Geologic Borehole and Well Completion Log



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San Diego, CA

(619) 453-9650



LOSAN 125CB4 TD 46.00' 1"=4.50' 1:54.00 980517 1023 Sheet 2 of 2

125CB4

Geologic Borehole and Well Completion Log (continued)

APPENDIX C

LABORATORY ANALYTICAL RESULTS

Quanterra Incorporated
1721 South Grand Avenue
Santa Ana, California 92705

714 258-8610 Telephone
714 258-0921 Fax

RECEIVED

FEB 15 1996

**PARSONS ENGINEERING
SCIENCE, INC. - LA JOLLA**

February 13, 1996

PARSONS ENGINEERING SCIENCE
9404 GENESEE AVENUE, SUITE 140
LA JOLLA, CA 92037
ATTN: MR. LARRY DUDUS

LIMS NO.: 116842-0001/0031
DATE SAMPLED: 16/17-JAN-96
DATE SAMPLE REC'D: 18-JAN-96
PROJECT: LAAFB/SITE CLOSURE

Enclosed with this letter is the **AMENDED** report containing the analytical results for the project specified above.

The Narrative section included in the following attachment provides a detailed description of all events that occurred during sample processing, analysis, and data review as applicable to the samples and analytical methods requested.

Report data sheets contain a list of the requested constituents measured in each test, the analytical results, and the standard reporting limits (RLs). Reporting limits are adjusted to reflect any dilution or dry weight correction, when applicable. Solid and waste matrix samples are reported on a dry weight basis for this report. Also provided in this report are the LIMS Report Key and the terms and abbreviations commonly used in our reports.

The report shall not be reproduced except in full, without the written approval of the laboratory.

If you have any questions regarding the data provided in this report, please call Tracy Sidwell at (714) 258-8610. Release of this report has been authorized by the Lab Director or the designee as demonstrated by the following signature.

Sincerely,


Project Manager

cc: Project File

LIMS REPORT KEY

Section	Description
Cover letter	Signature page, report narrative as applicable.
Sample Description Information	Tabulated cross-reference between the Lab ID and Client ID, including matrix, date and time sampled and the date received for all samples in the project.
Sample Analysis Results Sheets	Lists sample results, test components, reporting limit, dates prepared and analyzed and any data qualifiers. Pages are organized by test.
QC Lot Assignment Report	Cross-reference between lab ID's and applicable QC batches (DCS, LCS, SCS, Blank, MS/SD, DU)
Duplicate Control Sample Report	Percent recovery and RPD results, with acceptance limits, for the laboratory duplicate control samples for each test are tabulated in this report. These are measures of accuracy and precision for each test. Acceptance limits are based upon laboratory historical data.
Laboratory Control Sample Report	Percent recovery results for a single Laboratory Control Sample (if applicable) are tabulated in this report, with the applicable acceptance limits for each test.
Matrix Spike/Matrix Spike Duplicate Report	Percent recovery and RPD results for matrix-specific QC samples and acceptance limits, where applicable. This report can be used to assess matrix effects on an analysis.
Single Control Sample Report	A tabulation of the surrogate recoveries for the blank for organic analyses.
Method Blank Report	A summary of the results of the analysis of the method blank for each test.

List of Abbreviations and Terms

DCS	Duplicate Control Sample	MSD	Matrix Spike Duplicate
DU	Sample Duplicate	QC Run	Preparation batch
EB	Equipment Blank	QC Category	LIMS QC Category
FB	Field Blank	QC Lot	DCS batch
FD	Field Duplicate	ND	Not Detected at the reporting limit expressed
IDL	Instrument Detection Limit (Metals)	QC Matrix	Matrix of the laboratory control sample (s)
LCS	Laboratory Control Sample	RL	Reporting Limit
MB	Method Blank	QC	Quality Control
MDL	Method Detection Limit (Organics)	SA	Sample
MS	Matrix Spike	SD	See MSD
RPD	Relative Percent Difference	TB	Trip Blank
ppm (parts-per-million)	mg/L or mg/kg	ppb (parts-per-billion)	µg/L or µg/kg
QUAL	Qualifier flag	DIL	Dilution Factor

Refer to the Quanterra Incorporated Quality Assurance Management Plan for detailed explanations of terms summarized above.

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A. LIMS Datasheets	
B. QC Summaries	

CASE NARRATIVE

LIMS # 116842

First Amendment: The report was amended to remove the unknown volatile hydrocarbon (Method 8015 modified for Total Volatile Petroleum Hydrocarbons (TVPH)) and unknown extractable hydrocarbon (Method 8015 modified for Total Extractable Petroleum Hydrocarbons (TEPH)) components from the report. Please replace the following pages with those previously submitted in the report.

The report was also amended to include further clarification to the case narrative concerning the analysis of TVPH and TEPH.

I. CONDITION UPON RECEIPT

Cooler was received intact.

Sample containers were received intact. The VOA vials did not contain headspace. The sample container for sample EQUIPMENT RINSEATE (116842-0030) was preserved upon receipt at the laboratory for EPA method 418.1 (TRPH). All other sample containers had proper preservation and was verified (excluding VOA samples) upon receipt and documented. Sample container labels did agree with the COC as to sample ID, collection date/time, requested tests and/or preservatives.

Samples were received on time to meet the method holding time specifications. Any discrepancies identified upon sample receipt have been forwarded to the client and are documented in the enclosed COC records.

Additional MS/MSD analyses were performed on sample 241CB1-9-9.5 (116842-0003) along with those samples as designated on the chain of custody.

The analysis of SW8015-Modified (Gasoline) was canceled for all samples except for samples 241CB1-5-5.5, 241CB1-7-7.5, 241CB1-9-9.5, EQUIPMENT RINSEATE and TRIP BLANK (116842-0001, -0002, -0003, -0030 and -0031, respectively) per request by Parsons Engineering Science personnel on January 19, 1996.

II. ORGANIC ANALYSES (BY METHOD: SW8020(BTEX); SW8015-Modified;)

HOLDING TIME

All samples were prepared and analyzed within the method-specified holding time requirements.

METHOD BLANK

All method blanks met method- and/or project-specific QC criteria.

MS/MSD/LCS/DCS AND RPDs

All spike recovery and RPD data met method- and/or project-specific QC criteria.

SURROGATE RECOVERIES

All surrogate spike recoveries in samples and in QC samples met method- and/or project-specific QC criteria.

CASE NARRATIVE

LIMS # 116842

CALIBRATIONS

All calibrations and calibration verifications met method- and/or project-specific QC criteria.

SAMPLE RESULTS

The carbon range for sample quantitation for Total Volatile Petroleum Hydrocarbons (TVPH), as gasoline, was C6-C12.

The carbon range for sample quantitation for Total Extractable Petroleum Hydrocarbons (TEPH), as diesel, was C13-C22.

Results quantitated as diesel but qualified with a "y", have the following carbon ranges: 116842-0006 (C10-C22 +), -0009 (C13-C22 +), -0013 (C12-C22 +), and -0014 (C11-C22 +). The concentration reported for these samples was based on a quantitation between C13-C22.

III. METALS (BY METHOD: SW7421)

HOLDING TIME

All samples were prepared and analyzed within the method-specified holding time requirements.

METHOD BLANK

All method blank data met method- and/or project-specific QC criteria.

MS/MSD/LCS AND RPDs

The MS/MSD results for lead were outside the QC limits due to the levels of lead in the native sample. The associated LCS was within the specified QC limits.

CALIBRATIONS

All calibrations and calibration verifications met method- and/or project-specific QC criteria.

IV. GENERAL CHEMISTRY (BY METHOD: EPA418.1)

HOLDING TIME

All samples were prepared and analyzed within the method-specified holding time requirements.

METHOD BLANK

All method blanks met method- and/or project-specific QC criteria.

MS/MSD/LCS/DCS AND RPDs

All spike recovery and RPD data met method- and/or project-specific QC criteria.

CALIBRATIONS

All calibrations and calibration verifications met method- and/or project-specific QC criteria.



Environmental
Services

Total Volatile Petroleum Hydrocarbons
Method 8015 Modified (CADHS)

Client Name: Parsons Engineering Science
Client ID: 241CB1 (5.00,5.50,)
LAB ID: 116842-0001-SA
Matrix: SOIL
Authorized: 19 JAN 96
Instrument: GC/FID-VAB

Sampled: 16 JAN 96
Prepared: 23 JAN 96
Dilution: 1.0

Received: 18 JAN 96
Analyzed: 23 JAN 96

Parameter	Result	Qualifier	RL	Units
Gasoline	ND		1.3	mg/kg
Surrogate	Recovery		Acceptable Range	
a,a,a-Trifluorotoluene	83	%	50 - 150	

Percent moisture is 20%. All results and limits are reported on a dry weight basis.

ND = Not Detected



Environmental
Services

Total Volatile Petroleum Hydrocarbons
Method 8015 Modified (CADHS)

Client Name: Parsons Engineering Science
Client ID: 241CB1 (7.00,7.50,)
LAB ID: 116842-0002-SA
Matrix: SOIL
Authorized: 19 JAN 96
Instrument: GC/FID-VAB

Sampled: 16 JAN 96
Prepared: 23 JAN 96
Dilution: 1.0

Received: 18 JAN 96
Analyzed: 23 JAN 96

Parameter	Result	Qualifier	RL	Units
Gasoline	ND		1.3	mg/kg
Surrogate	Recovery		Acceptable Range	
a,a,a-Trifluorotoluene	75	%	50 - 150	

Percent moisture is 22%. All results and limits are reported on a dry weight basis.

ND = Not Detected



Environmental
Services

Total Volatile Petroleum Hydrocarbons
Method 8015 Modified (CADHS)

Client Name: Parsons Engineering Science
Client ID: 241CB1 (9.00,9.50,)
LAB ID: 116842-0003-SA
Matrix: SOIL
Authorized: 19 JAN 96
Instrument: GC/FID-VAB

Sampled: 16 JAN 96
Prepared: 23 JAN 96
Dilution: 1.0

Received: 18 JAN 96
Analyzed: 23 JAN 96

Parameter	Result	Qualifier	RL	Units
Gasoline	ND		1.3	mg/kg
Surrogate	Recovery		Acceptable Range	
a,a,a-Trifluorotoluene	77	%	50 - 150	

Percent moisture is 22%.

All results and limits are reported on a dry weight basis.

ND = Not Detected

Aromatic Volatile Organics
Method 8020



Client Name: Parsons Engineering Science
Client ID: 241CB1 (5.00,5.50,)
LAB ID: 116842-0001-SA
Matrix: SOIL
Authorized: 19 JAN 96
Instrument: GC/PID-VKA

Sampled: 16 JAN 96
Prepared: 25 JAN 96
Dilution: 1.0

Received: 18 JAN 96
Analyzed: 25 JAN 96

Parameter	Result	Qualifier	RL	Units
Benzene	ND		1.3	ug/kg
Toluene	ND		6.3	ug/kg
Ethylbenzene	ND		6.3	ug/kg
Xylenes (total)	ND		6.3	ug/kg
Surrogate	Recovery		Acceptable Range	
Bromofluorobenzene	54	%	30	- 137

Percent moisture is 20%.

All results and limits are reported on a dry weight basis.

ND = Not Detected

Aromatic Volatile Organics
Method 8020



Client Name: Parsons Engineering Science
Client ID: 241CB1 (7.00,7.50,)
LAB ID: 116842-0002-SA
Matrix: SOIL
Authorized: 19 JAN 96
Instrument: GC/PID-VKA

Sampled: 16 JAN 96
Prepared: 25 JAN 96
Dilution: 1.0

Received: 18 JAN 96
Analyzed: 25 JAN 96

Parameter	Result	Qualifier	RL	Units
Benzene	ND		1.3	ug/kg
Toluene	ND		6.4	ug/kg
Ethylbenzene	ND		6.4	ug/kg
Xylenes (total)	ND		6.4	ug/kg
Surrogate	Recovery		Acceptable Range	
Bromofluorobenzene	58	%	30 - 137	

Percent moisture is 22%. All results and limits are reported on a dry weight basis.

ND = Not Detected

Aromatic Volatile Organics
Method 8020



Client Name: Parsons Engineering Science
Client ID: 241CB1 (9.00,9.50,)
LAB ID: 116842-0003-SA
Matrix: SOIL
Authorized: 19 JAN 96
Instrument: GC/PID-VKA

Sampled: 16 JAN 96
Prepared: 25 JAN 96
Dilution: 1.0

Received: 18 JAN 96
Analyzed: 25 JAN 96

Parameter	Result	Qualifier	RL	Units
Benzene	ND		1.3	ug/kg
Toluene	ND		6.4	ug/kg
Ethylbenzene	ND		6.4	ug/kg
Xylenes (total)	ND		6.4	ug/kg
Surrogate	Recovery		Acceptable Range	
Bromofluorobenzene	61	%	30 - 137	

Percent moisture is 22%.

All results and limits are reported on a dry weight basis.

ND = Not Detected

METALS

Client Name: Parsons Engineering Science
Client ID: 241CB1 (5.00,5.50,)
LAB ID: 116842-0001-SA
Matrix: SOIL
Authorized: 19 JAN 96

Sampled: 16 JAN 96
Prepared: See Below

Received: 18 JAN 96
Analyzed: See Below

Parameter	Result	Qual	DIL	RL	Units	Method	Prep Date	Analyzed Date
Lead	11.8		5.0	3.1	mg/kg	SW7421	22 JAN 96	23 JAN 96

Percent moisture is 20%.

All results and limits are reported on a dry weight basis.



Environmental
Services

METALS

Client Name: Parsons Engineering Science
Client ID: 241CB1 (7.00,7.50,)
LAB ID: 116842-0002-SA
Matrix: SOIL
Authorized: 19 JAN 96

Sampled: 16 JAN 96
Prepared: See Below

Received: 18 JAN 96
Analyzed: See Below

Parameter	Result	Qual	DIL	RL	Units	Method	Prep Date	Analyzed Date
Lead	12.4		5.0	3.2	mg/kg	SW7421	22 JAN 96	23 JAN 96

Percent moisture is 22%.

All results and limits are reported on a dry weight basis.

METALS

Client Name: Parsons Engineering Science
Client ID: 241CB1 (9.00,9.50,)
LAB ID: 116842-0003-SA
Matrix: SOIL
Authorized: 19 JAN 96

Sampled: 16 JAN 96
Prepared: See Below

Received: 18 JAN 96
Analyzed: See Below

Parameter	Result	Qual	DIL	RL	Units	Method	Prep Date	Analyzed Date
Lead	15.2		5.0	3.2	mg/kg	SW7421	22 JAN 96	23 JAN 96

Percent moisture is 22%.

All results and limits are reported on a dry weight basis.



Environmental
Services

GENERAL INORGANICS

Client Name: Parsons Engineering Science
Client ID: 241CB1 (5.00,5.50,)
LAB ID: 116842-0001-SA
Matrix: SOIL
Authorized: 19 JAN 96

Sampled: 16 JAN 96
Prepared: See Below

Received: 18 JAN 96
Analyzed: See Below

Parameter	Result	Qual	DIL	RL	Units	Method	Prep Date	Analyzed Date
Percent Water	20		1.0	0.10	%	D2216	NA	23 JAN 96



GENERAL INORGANICS

Client Name: Parsons Engineering Science
Client ID: 241CB1 (7.00,7.50,)
LAB ID: 116842-0002-SA
Matrix: SOIL
Authorized: 19 JAN 96

Sampled: 16 JAN 96
Prepared: See Below

Received: 18 JAN 96
Analyzed: See Below

Parameter	Result	Qual	DIL	RL	Units	Method	Prep Date	Analyzed Date
Percent Water	22		1.0	0.10	%	D2216	NA	23 JAN 96



Environmental
Services

GENERAL INORGANICS

Client Name: Parsons Engineering Science
Client ID: 241CB1 (9.00,9.50,)
LAB ID: 116842-0003-SA
Matrix: SOIL
Authorized: 19 JAN 96

Sampled: 16 JAN 96
Prepared: See Below

Received: 18 JAN 96
Analyzed: See Below

Parameter	Result Qual	DIL	RL	Units	Method	Prep Date	Analyzed Date
Percent Water	22	1.0	0.10	%	D2216	NA	23 JAN 96



Environmental
Services

GENERAL INORGANICS

Client Name: Parsons Engineering Science
Client ID: 241CB1 (9.00,9.50,)
LAB ID: 116842-0003-DU
Matrix: SOIL
Authorized: 19 JAN 96

Sampled: 16 JAN 96
Prepared: See Below

Received: 18 JAN 96
Analyzed: See Below

Parameter	Result	Qual	DIL	RL	Units	Method	Prep Date	Analyzed Date
Percent Water	23		1.0	0.10	%	D2216	NA	23 JAN 96



Environmental
Services

Total Volatile Petroleum Hydrocarbons
Method 8015 Modified (CADHS)

Client Name: Parsons Engineering Science
Client ID: EQUIPMENT RINSEATE (0.00,0.00,)
LAB ID: 116842-0030-EB
Matrix: WATER-QA
Authorized: 19 JAN 96
Instrument: GC/FID

Sampled: 17 JAN 96
Prepared: 22 JAN 96
Dilution: 1.0

Received: 18 JAN 96
Analyzed: 22 JAN 96

Parameter	Result	Qualifier	RL	Units
Gasoline	ND		0.10	mg/L
Surrogate	Recovery		Acceptable Range	
a,a,a-Trifluorotoluene	114	%	50 - 150	

ND = Not Detected



Environmental
Services

Total Volatile Petroleum Hydrocarbons
Method 8015 Modified (CADHS)

Client Name: Parsons Engineering Science
Client ID: TRIP BLANK (0.00,0.00,)
LAB ID: 116842-0031-TB
Matrix: WATER-QA
Authorized: 19 JAN 96
Instrument: GC/FID

Sampled: 17 JAN 96
Prepared: 22 JAN 96
Dilution: 1.0

Received: 18 JAN 96
Analyzed: 22 JAN 96

Parameter	Result	Qualifier	RL	Units
Gasoline	ND		0.10	mg/L
Surrogate	Recovery		Acceptable Range	
a,a,a-Trifluorotoluene	115	%	50 - 150	

ND = Not Detected

Aromatic Volatile Organics
Method 8020



Client Name: Parsons Engineering Science
Client ID: 125CB5 (10.00,10.50,)
LAB ID: 116842-0029-SA
Matrix: SOIL
Authorized: 19 JAN 96
Instrument: GC/PID-VKA

Sampled: 17 JAN 96
Prepared: 25 JAN 96
Dilution: 1.0

Received: 18 JAN 96
Analyzed: 25 JAN 96

Parameter	Result	Qualifier	RL	Units
Benzene	ND		1.1	ug/kg
Toluene	ND		5.7	ug/kg
Ethylbenzene	ND		5.7	ug/kg
Xylenes (total)	ND		5.7	ug/kg
Surrogate	Recovery		Acceptable Range	
Bromofluorobenzene	38	%	30 - 137	

Percent moisture is 13%. All results and limits are reported on a dry weight basis.

ND = Not Detected

Total Extractable Petroleum Hydrocarbons
Method 8015 Modified (CADHS)

Client Name: Parsons Engineering Science
Client ID: 125CB5 (10.00,10.50,)
LAB ID: 116842-0029-SA
Matrix: SOIL
Authorized: 19 JAN 96
Instrument: GC/FID-T5

Sampled: 17 JAN 96
Prepared: 19 JAN 96
Dilution: 1.0

Received: 18 JAN 96
Analyzed: 23 JAN 96

Parameter	Result	Qualifier	RL	Units
Diesel Fuel #2	ND		11	mg/kg
Surrogate	Recovery		Acceptable Range	
Benzo(a)pyrene	75	%	50 - 150	

Percent moisture is 13%. All results and limits are reported on a dry weight basis.

ND = Not Detected



Total Recoverable Petroleum Hydrocarbons
Method 418.1

Environmental
Services

Client Name: Parsons Engineering Science
Client ID: 125CB5 (10.00,10.50,)
LAB ID: 116842-0029-SA
Matrix: SOIL
Authorized: 19 JAN 96

Sampled: 17 JAN 96
Prepared: See Below

Received: 18 JAN 96
Analyzed: See Below

Parameter	Result Qual	DIL	RL	Units	Method	Prep Date	Analyzed Date
TPH, Recoverable	ND	1.0	11	mg/kg	E418.1	22 JAN 96	23 JAN 96

Percent moisture is 13%.

All results and limits are reported on a dry weight basis.

ND = Not Detected

Aromatic Volatile Organics
Method 8020



Client Name: Parsons Engineering Science
Client ID: 125CB1 (15.00,15.50,)
LAB ID: 116842-0004-SA
Matrix: SOIL
Authorized: 19 JAN 96
Instrument: GC/PID-VKA

Sampled: 16 JAN 96
Prepared: 24 JAN 96
Dilution: 1.0

Received: 18 JAN 96
Analyzed: 24 JAN 96

Parameter	Result	Qualifier	RL	Units
Benzene	ND		1.1	ug/kg
Toluene	ND		5.3	ug/kg
Ethylbenzene	ND		5.3	ug/kg
Xylenes (total)	ND		5.3	ug/kg
Surrogate	Recovery		Acceptable Range	
Bromofluorobenzene	96	%	30 - 137	

Percent moisture is 6.1%. All results and limits are reported on a dry weight basis.

ND = Not Detected



Environmental
Services

Total Extractable Petroleum Hydrocarbons
Method 8015 Modified (CADHS)

Client Name: Parsons Engineering Science
Client ID: 125CB1 (15.00,15.50,)
LAB ID: 116842-0004-SA
Matrix: SOIL
Authorized: 19 JAN 96
Instrument: GC/FID-T5

Sampled: 16 JAN 96
Prepared: 19 JAN 96
Dilution: 1.0

Received: 18 JAN 96
Analyzed: 22 JAN 96

Parameter	Result	Qualifier	RL	Units
Diesel Fuel #2	ND		11	mg/kg
Surrogate	Recovery		Acceptable Range	
Benzo(a)pyrene	77	%	50 - 150	

Percent moisture is 6.1%. All results and limits are reported on a dry weight basis.

ND = Not Detected



Total Recoverable Petroleum Hydrocarbons
Method 418.1

Environmental
Services

Client Name: Parsons Engineering Science
Client ID: 125CB1 (15.00,15.50,)
LAB ID: 116842-0004-SA
Matrix: SOIL
Authorized: 19 JAN 96

Sampled: 16 JAN 96
Prepared: See Below

Received: 18 JAN 96
Analyzed: See Below

Parameter	Result Qual	DIL	RL	Units	Method	Prep Date	Analyzed Date
TPH, Recoverable	ND	1.0	11	mg/kg	E418.1	24 JAN 96	25 JAN 96

Percent moisture is 6.1%. All results and limits are reported on a dry weight basis.

ND = Not Detected

Aromatic Volatile Organics
Method 8020



Environmental
Services

Client Name: Parsons Engineering Science
Client ID: 125CB1 (25.00,25.50,)
LAB ID: 116842-0005-SA
Matrix: SOIL
Authorized: 19 JAN 96
Instrument: GC/PID-VKA

Sampled: 16 JAN 96
Prepared: 24 JAN 96
Dilution: 1.0

Received: 18 JAN 96
Analyzed: 24 JAN 96

Parameter	Result	Qualifier	RL	Units
Benzene	ND		1.0	ug/kg
Toluene	ND		5.2	ug/kg
Ethylbenzene	ND		5.2	ug/kg
Xylenes (total)	ND		5.2	ug/kg
Surrogate	Recovery		Acceptable Range	
Bromofluorobenzene	79	%	30 - 137	

Percent moisture is 4.1%. All results and limits are reported on a dry weight basis.

ND = Not Detected



Environmental
Services

Total Extractable Petroleum Hydrocarbons
Method 8015 Modified (CADHS)

Client Name: Parsons Engineering Science
Client ID: 125CB1 (25.00,25.50,)
LAB ID: 116842-0005-SA
Matrix: SOIL
Authorized: 19 JAN 96
Instrument: GC/FID-T5

Sampled: 16 JAN 96
Prepared: 19 JAN 96
Dilution: 1.0

Received: 18 JAN 96
Analyzed: 22 JAN 96

Parameter	Result	Qualifier	RL	Units
Diesel Fuel #2	ND		10	mg/kg
Surrogate	Recovery		Acceptable Range	
Benzo(a)pyrene	72	%	50 - 150	

Percent moisture is 4.1%. All results and limits are reported on a dry weight basis.

ND = Not Detected



Environmental
Services

Total Recoverable Petroleum Hydrocarbons
Method 418.1

Client Name: Parsons Engineering Science
Client ID: 125CB1 (25.00,25.50,)
LAB ID: 116842-0005-SA
Matrix: SOIL
Authorized: 19 JAN 96

Sampled: 16 JAN 96
Prepared: See Below

Received: 18 JAN 96
Analyzed: See Below

Parameter	Result	Qual	DIL	RL	Units	Method	Prep Date	Analyzed Date
TPH, Recoverable	ND		1.0	10	mg/kg	E418.1	24 JAN 96	25 JAN 96

Percent moisture is 4.1%. All results and limits are reported on a dry weight basis.

ND = Not Detected

Aromatic Volatile Organics
Method 8020 - Mid-Level



Client Name: Parsons Engineering Science
Client ID: 125CB1 (35.00,35.50,)
LAB ID: 116842-0006-SA
Matrix: SOIL
Authorized: 19 JAN 96
Instrument: GC/PID-VKA

Sampled: 16 JAN 96
Prepared: 26 JAN 96
Dilution: 2.0

Received: 18 JAN 96
Analyzed: 26 JAN 96

Parameter	Result	Qualifier	RL	Units
Benzene	ND	G	740	ug/kg
Toluene	ND	G	740	ug/kg
Ethylbenzene	ND	G	740	ug/kg
Xylenes (total)	ND	G	740	ug/kg
Surrogate	Recovery		Acceptable Range	
Bromofluorobenzene	102	%	28 - 139	

Percent moisture is 32%. All results and limits are reported on a dry weight basis.

G = Reporting Limit elevated due to sample matrix interference.
ND = Not Detected



Environmental
Services

Total Extractable Petroleum Hydrocarbons
Method 8015 Modified (CADHS)

Client Name: Parsons Engineering Science
Client ID: 125CB1 (35.00,35.50,)
LAB ID: 116842-0006-SA
Matrix: SOIL
Authorized: 19 JAN 96
Instrument: GC/FID-T5

Sampled: 16 JAN 96
Prepared: 19 JAN 96
Dilution: 1.0

Received: 18 JAN 96
Analyzed: 22 JAN 96

Parameter	Result	Qualifier	RL	Units
Diesel Fuel #2	1500	y	15	mg/kg
Surrogate	Recovery		Acceptable Range	
Benzo(a)pyrene	78	%	50 - 150	

Percent moisture is 32%. All results and limits are reported on a dry weight basis.

y = Chromatographic profile is not consistent with pattern(s) exhibited by reference fuel standards. Quantitation of unknown hydrocarbons in sample is based on diesel fuel.

Total Recoverable Petroleum Hydrocarbons
Method 418.1

Client Name: Parsons Engineering Science
Client ID: 125CB1 (35.00,35.50,)
LAB ID: 116842-0006-SA
Matrix: SOIL
Authorized: 19 JAN 96

Sampled: 16 JAN 96
Prepared: See Below

Received: 18 JAN 96
Analyzed: See Below

Parameter	Result	Qual	DIL	RL	Units	Method	Prep Date	Analyzed Date
TPH, Recoverable	3100		50	740	mg/kg	E418.1	24 JAN 96	25 JAN 96

Percent moisture is 32%. All results and limits are reported on a dry weight basis.

Aromatic Volatile Organics
Method 8020



Environmental
Services

Client Name: Parsons Engineering Science
Client ID: 125CB1 (40.00,40.50,)
LAB ID: 116842-0007-SA
Matrix: SOIL
Authorized: 19 JAN 96
Instrument: GC/PID-VKA

Sampled: 16 JAN 96
Prepared: 25 JAN 96
Dilution: 1.0

Received: 18 JAN 96
Analyzed: 25 JAN 96

Parameter	Result	Qualifier	RL	Units
Benzene	ND		1.5	ug/kg
Toluene	ND		7.4	ug/kg
Ethylbenzene	ND		7.4	ug/kg
Xylenes (total)	ND		7.4	ug/kg
Surrogate	Recovery		Acceptable Range	
Bromofluorobenzene	62	%	30 - 137	

Percent moisture is 32%. All results and limits are reported on a dry weight basis.

ND = Not Detected



Environmental
Services

Total Extractable Petroleum Hydrocarbons
Method 8015 Modified (CADHS)

Client Name: Parsons Engineering Science

Client ID: 125CB1 (40.00,40.50,)

LAB ID: 116842-0007-SA

Matrix: SOIL

Authorized: 19 JAN 96

Instrument: GC/FID-T5

Sampled: 16 JAN 96

Prepared: 19 JAN 96

Dilution: 1.0

Received: 18 JAN 96

Analyzed: 22 JAN 96

Parameter	Result	Qualifier	RL	Units
Diesel Fuel #2	ND		15	mg/kg
Surrogate	Recovery		Acceptable Range	
Benzo(a)pyrene	83	%	50 - 150	

Percent moisture is 32%.

All results and limits are reported on a dry weight basis.

ND = Not Detected



Total Recoverable Petroleum Hydrocarbons
Method 418.1

Environmental
Services

Client Name: Parsons Engineering Science
Client ID: 125CB1 (40.00,40.50,)
LAB ID: 116842-0007-SA
Matrix: SOIL
Authorized: 19 JAN 96

Sampled: 16 JAN 96
Prepared: See Below

Received: 18 JAN 96
Analyzed: See Below

Parameter	Result Qual	DIL	RL	Units	Method	Prep Date	Analyzed Date
TPH, Recoverable	ND	1.0	15	mg/kg	E418.1	24 JAN 96	25 JAN 96

Percent moisture is 32%.

All results and limits are reported on a dry weight basis.

ND = Not Detected

Aromatic Volatile Organics
Method 8020



Client Name: Parsons Engineering Science
Client ID: 125CB1 (45.00,45.50,)
LAB ID: 116842-0008-SA
Matrix: SOIL
Authorized: 19 JAN 96
Instrument: GC/PID-VKA

Sampled: 16 JAN 96
Prepared: 24 JAN 96
Dilution: 1.0

Received: 18 JAN 96
Analyzed: 24 JAN 96

Parameter	Result	Qualifier	RL	Units
Benzene	ND		1.1	ug/kg
Toluene	ND		5.3	ug/kg
Ethylbenzene	ND		5.3	ug/kg
Xylenes (total)	ND		5.3	ug/kg
Surrogate	Recovery		Acceptable Range	
Bromofluorobenzene	108	%	30 - 137	

Percent moisture is 5.5%. All results and limits are reported on a dry weight basis.

ND = Not Detected



Environmental
Services

Total Extractable Petroleum Hydrocarbons
Method 8015 Modified (CADHS)

Client Name: Parsons Engineering Science
Client ID: 125CB1 (45.00,45.50,)
LAB ID: 116842-0008-SA
Matrix: SOIL
Authorized: 19 JAN 96
Instrument: GC/FID-T5

Sampled: 16 JAN 96
Prepared: 19 JAN 96
Dilution: 1.0

Received: 18 JAN 96
Analyzed: 22 JAN 96

Parameter	Result	Qualifier	RL	Units
Diesel Fuel #2	ND		11	mg/kg
Surrogate	Recovery		Acceptable Range	
Benzo(a)pyrene	76	%	50 - 150	

Percent moisture is 5.5%. All results and limits are reported on a dry weight basis.

ND = Not Detected



Total Recoverable Petroleum Hydrocarbons
Method 418.1

Environmental
Services

Client Name: Parsons Engineering Science
Client ID: 125CB1 (45.00,45.50,)
LAB ID: 116842-0008-SA
Matrix: SOIL
Authorized: 19 JAN 96

Sampled: 16 JAN 96
Prepared: See Below

Received: 18 JAN 96
Analyzed: See Below

Parameter	Result	Qual	DIL	RL	Units	Method	Prep Date	Analyzed Date
TPH, Recoverable	ND		1.0	11	mg/kg	E418.1	24 JAN 96	25 JAN 96

Percent moisture is 5.5%. All results and limits are reported on a dry weight basis.

ND = Not Detected

Aromatic Volatile Organics
Method 8020



Client Name: Parsons Engineering Science
Client ID: 125CB2 (5.00,5.50,)
LAB ID: 116842-0009-SA
Matrix: SOIL
Authorized: 19 JAN 96
Instrument: GC/PID-VKA

Sampled: 16 JAN 96
Prepared: 24 JAN 96
Dilution: 1.0

Received: 18 JAN 96
Analyzed: 24 JAN 96

Parameter	Result	Qualifier	RL	Units
Benzene	ND		1.1	ug/kg
Toluene	ND		5.5	ug/kg
Ethylbenzene	ND		5.5	ug/kg
Xylenes (total)	ND		5.5	ug/kg
Surrogate	Recovery		Acceptable Range	
Bromofluorobenzene	74	%	30 - 137	

Percent moisture is 9.6%. All results and limits are reported on a dry weight basis.

ND = Not Detected



Environmental
Services

Total Extractable Petroleum Hydrocarbons
Method 8015 Modified (CADHS)

Client Name: Parsons Engineering Science

Client ID: 125CB2 (5.00,5.50,)

LAB ID: 116842-0009-SA

Matrix: SOIL

Authorized: 19 JAN 96

Instrument: GC/FID-T5

Sampled: 16 JAN 96

Prepared: 19 JAN 96

Dilution: 1.0

Received: 18 JAN 96

Analyzed: 22 JAN 96

Parameter	Result	Qualifier	RL	Units
Diesel Fuel #2	71	y	11	mg/kg
Surrogate	Recovery		Acceptable Range	
Benzo(a)pyrene	85	%	50 - 150	

Percent moisture is 9.6%. All results and limits are reported on a dry weight basis.

y = Chromatographic profile is not consistent with pattern(s) exhibited by reference fuel standards. Quantitation of unknown hydrocarbons in sample is based on diesel fuel.



Total Recoverable Petroleum Hydrocarbons
Method 418.1

Environmental
Services

Client Name: Parsons Engineering Science
Client ID: 125CB2 (5.00,5.50,)
LAB ID: 116842-0009-SA
Matrix: SOIL
Authorized: 19 JAN 96

Sampled: 16 JAN 96
Prepared: See Below

Received: 18 JAN 96
Analyzed: See Below

Parameter	Result	Qual	DIL	RL	Units	Method	Prep Date	Analyzed Date
TPH, Recoverable	270		4.0	44	mg/kg	E418.1	24 JAN 96	25 JAN 96

Percent moisture is 9.6%. All results and limits are reported on a dry weight basis.

Aromatic Volatile Organics
Method 8020



Client Name: Parsons Engineering Science
Client ID: 125CB2 (13.50,14.00,)
LAB ID: 116842-0010-SA
Matrix: SOIL
Authorized: 19 JAN 96
Instrument: GC/PID-VKA

Sampled: 16 JAN 96
Prepared: 24 JAN 96
Dilution: 1.0

Received: 18 JAN 96
Analyzed: 24 JAN 96

Parameter	Result	Qualifier	RL	Units
Benzene	ND		1.1	ug/kg
Toluene	ND		5.4	ug/kg
Ethylbenzene	ND		5.4	ug/kg
Xylenes (total)	ND		5.4	ug/kg
Surrogate	Recovery		Acceptable Range	
Bromofluorobenzene	100	%	30 - 137	

Percent moisture is 8.2%. All results and limits are reported on a dry weight basis.

ND = Not Detected



Environmental
Services

Total Extractable Petroleum Hydrocarbons
Method 8015 Modified (CADHS)

Client Name: Parsons Engineering Science
Client ID: 125CB2 (13.50,14.00,)
LAB ID: 116842-0010-SA
Matrix: SOIL
Authorized: 19 JAN 96
Instrument: GC/FID-T5

Sampled: 16 JAN 96
Prepared: 19 JAN 96
Dilution: 1.0

Received: 18 JAN 96
Analyzed: 22 JAN 96

Parameter	Result	Qualifier	RL	Units
Diesel Fuel #2	ND		11	mg/kg
Surrogate	Recovery		Acceptable Range	
Benzo(a)pyrene	73	%	50 - 150	

Percent moisture is 8.2%. All results and limits are reported on a dry weight basis.

ND = Not Detected



Total Recoverable Petroleum Hydrocarbons
Method 418.1

Environmental
Services

Client Name: Parsons Engineering Science
Client ID: 125CB2 (13.50,14.00,)
LAB ID: 116842-0010-SA
Matrix: SOIL
Authorized: 19 JAN 96

Sampled: 16 JAN 96
Prepared: See Below

Received: 18 JAN 96
Analyzed: See Below

Parameter	Result	Qual	DIL	RL	Units	Method	Prep Date	Analyzed Date
TPH, Recoverable	ND		1.0	11	mg/kg	E418.1	24 JAN 96	25 JAN 96

Percent moisture is 8.2%. All results and limits are reported on a dry weight basis.

ND = Not Detected

Aromatic Volatile Organics
Method 8020



Client Name: Parsons Engineering Science
Client ID: 125CB2 (16.00,16.50,)
LAB ID: 116842-0011-SA
Matrix: SOIL
Authorized: 19 JAN 96
Instrument: GC/PID-VKA

Sampled: 16 JAN 96
Prepared: 24 JAN 96
Dilution: 1.0

Received: 18 JAN 96
Analyzed: 24 JAN 96

Parameter	Result	Qualifier	RL	Units
Benzene	ND		1.1	ug/kg
Toluene	ND		5.4	ug/kg
Ethylbenzene	ND		5.4	ug/kg
Xylenes (total)	ND		5.4	ug/kg
Surrogate	Recovery		Acceptable Range	
Bromofluorobenzene	88	%	30 - 137	

Percent moisture is 8.2%. All results and limits are reported on a dry weight basis.

ND = Not Detected



Environmental
Services

Total Extractable Petroleum Hydrocarbons
Method 8015 Modified (CADHS)

Client Name: Parsons Engineering Science

Client ID: 125CB2 (16.00,16.50,)

LAB ID: 116842-0011-SA

Matrix: SOIL

Authorized: 19 JAN 96

Instrument: GC/FID-T5

Sampled: 16 JAN 96

Prepared: 19 JAN 96

Dilution: 1.0

Received: 18 JAN 96

Analyzed: 22 JAN 96

Parameter	Result	Qualifier	RL	Units
Diesel Fuel #2	ND		11	mg/kg
Surrogate	Recovery		Acceptable Range	
Benzo(a)pyrene	69	%	50 - 150	

Percent moisture is 8.2%. All results and limits are reported on a dry weight basis.

ND = Not Detected



Total Recoverable Petroleum Hydrocarbons
Method 418.1

Environmental
Services

Client Name: Parsons Engineering Science
Client ID: 125CB2 (16.00,16.50,)
LAB ID: 116842-0011-SA
Matrix: SOIL
Authorized: 19 JAN 96

Sampled: 16 JAN 96
Prepared: See Below

Received: 18 JAN 96
Analyzed: See Below

Parameter	Result Qual	DIL	RL	Units	Method	Prep Date	Analyzed Date
TPH, Recoverable	ND	1.0	11	mg/kg	E418.1	24 JAN 96	25 JAN 96

Percent moisture is 8.2%. All results and limits are reported on a dry weight basis.

ND = Not Detected

Aromatic Volatile Organics
Method 8020



Client Name: Parsons Engineering Science

Client ID: 125CB2 (21.00,21.50,)

LAB ID: 116842-0012-SA

Matrix: SOIL

Sampled: 16 JAN 96

Received: 18 JAN 96

Authorized: 19 JAN 96

Prepared: 24 JAN 96

Analyzed: 24 JAN 96

Instrument: GC/PID-VKA

Dilution: 1.0

Parameter	Result	Qualifier	RL	Units
Benzene	ND		1.1	ug/kg
Toluene	ND		5.3	ug/kg
Ethylbenzene	ND		5.3	ug/kg
Xylenes (total)	ND		5.3	ug/kg
Surrogate	Recovery		Acceptable Range	
Bromofluorobenzene	55	%	30	- 137

Percent moisture is 5.6%. All results and limits are reported on a dry weight basis.

ND = Not Detected



Environmental
Services

Total Extractable Petroleum Hydrocarbons
Method 8015 Modified (CADHS)

Client Name: Parsons Engineering Science
Client ID: 125CB2 (21.00,21.50,)
LAB ID: 116842-0012-SA
Matrix: SOIL
Authorized: 19 JAN 96
Instrument: GC/FID-T5

Sampled: 16 JAN 96
Prepared: 19 JAN 96
Dilution: 1.0

Received: 18 JAN 96
Analyzed: 22 JAN 96

Parameter	Result	Qualifier	RL	Units
Diesel Fuel #2	ND		11	mg/kg
Surrogate	Recovery		Acceptable Range	
Benzo(a)pyrene	72	%	50 - 150	

Percent moisture is 5.6%. All results and limits are reported on a dry weight basis.

ND = Not Detected



Total Recoverable Petroleum Hydrocarbons
Method 418.1

Environmental
Services

Client Name: Parsons Engineering Science
Client ID: 125CB2 (21.00,21.50,)
LAB ID: 116842-0012-SA
Matrix: SOIL
Authorized: 19 JAN 96

Sampled: 16 JAN 96
Prepared: See Below

Received: 18 JAN 96
Analyzed: See Below

Parameter	Result Qual	DIL	RL	Units	Method	Prep Date	Analyzed Date
TPH, Recoverable	ND	1.0	11	mg/kg	E418.1	24 JAN 96	25 JAN 96

Percent moisture is 5.6%. All results and limits are reported on a dry weight basis.

ND = Not Detected

Aromatic Volatile Organics
Method 8020



Client Name: Parsons Engineering Science
Client ID: 125CB2 (26.00,26.50,)
LAB ID: 116842-0013-SA
Matrix: SOIL
Authorized: 19 JAN 96
Instrument: GC/PID-VKA

Sampled: 16 JAN 96
Prepared: 24 JAN 96
Dilution: 1.0

Received: 18 JAN 96
Analyzed: 24 JAN 96

Parameter	Result	Qualifier	RL	Units
Benzene	ND		1.0	ug/kg
Toluene	ND		5.2	ug/kg
Ethylbenzene	ND		5.2	ug/kg
Xylenes (total)	ND		5.2	ug/kg
Surrogate	Recovery		Acceptable Range	
Bromofluorobenzene	68	%	30 - 137	

Percent moisture is 3.7%. All results and limits are reported on a dry weight basis.

ND = Not Detected



Environmental
Services

Total Extractable Petroleum Hydrocarbons
Method 8015 Modified (CADHS)

Client Name: Parsons Engineering Science
Client ID: 125CB2 (26.00,26.50,)
LAB ID: 116842-0013-SA
Matrix: SOIL
Authorized: 19 JAN 96
Instrument: GC/FID-T5

Sampled: 16 JAN 96
Prepared: 19 JAN 96
Dilution: 10

Received: 18 JAN 96
Analyzed: 23 JAN 96

Parameter	Result	Qualifier	RL	Units
Diesel Fuel #2	5200	y	100	mg/kg
Surrogate	Recovery		Acceptable Range	
Benzo(a)pyrene	76	%	50 - 150	

Percent moisture is 3.7%. All results and limits are reported on a dry weight basis.

y = Chromatographic profile is not consistent with pattern(s) exhibited by reference fuel standards. Quantitation of unknown hydrocarbons in sample is based on diesel fuel.



Total Recoverable Petroleum Hydrocarbons
Method 418.1

Environmental
Services

Client Name: Parsons Engineering Science
Client ID: 125CB2 (26.00,26.50,)
LAB ID: 116842-0013-SA
Matrix: SOIL
Authorized: 19 JAN 96

Sampled: 16 JAN 96
Prepared: See Below

Received: 18 JAN 96
Analyzed: See Below

Parameter	Result	Qual	DIL	RL	Units	Method	Prep Date	Analyzed Date
TPH, Recoverable	8900		200	2100	mg/kg	E418.1	22 JAN 96	23 JAN 96

Percent moisture is 3.7%. All results and limits are reported on a dry weight basis.

Aromatic Volatile Organics
Method 8020



Client Name: Parsons Engineering Science
Client ID: 125CB2 (31.00,31.50,)
LAB ID: 116842-0014-SA
Matrix: SOIL
Authorized: 19 JAN 96
Instrument: GC/PID-VKA

Sampled: 16 JAN 96
Prepared: 24 JAN 96
Dilution: 1.0

Received: 18 JAN 96
Analyzed: 24 JAN 96

Parameter	Result	Qualifier	RL	Units
Benzene	ND		1.0	ug/kg
Toluene	ND		5.2	ug/kg
Ethylbenzene	ND		5.2	ug/kg
Xylenes (total)	ND		5.2	ug/kg
Surrogate	Recovery		Acceptable Range	
Bromofluorobenzene	75	%	30 - 137	

Percent moisture is 4.6%. All results and limits are reported on a dry weight basis.

ND = Not Detected



Environmental
Services

Total Extractable Petroleum Hydrocarbons
Method 8015 Modified (CADHS)

Client Name: Parsons Engineering Science
Client ID: 125CB2 (31.00,31.50,)
LAB ID: 116842-0014-SA
Matrix: SOIL
Authorized: 19 JAN 96
Instrument: GC/FID-T5

Sampled: 16 JAN 96
Prepared: 19 JAN 96
Dilution: 10

Received: 18 JAN 96
Analyzed: 23 JAN 96

Parameter	Result	Qualifier	RL	Units
Diesel Fuel #2	4000	y	100	mg/kg
Surrogate	Recovery		Acceptable Range	
Benzo(a)pyrene	82	%	50 - 150	

Percent moisture is 4.6%. All results and limits are reported on a dry weight basis.

y = Chromatographic profile is not consistent with pattern(s) exhibited by reference fuel standards. Quantitation of unknown hydrocarbons in sample is based on diesel fuel.



Environmental
Services

Total Recoverable Petroleum Hydrocarbons
Method 418.1

Client Name: Parsons Engineering Science
Client ID: 125CB2 (31.00,31.50,)
LAB ID: 116842-0014-SA
Matrix: SOIL
Authorized: 19 JAN 96

Sampled: 16 JAN 96
Prepared: See Below

Received: 18 JAN 96
Analyzed: See Below

Parameter	Result	Qual	DIL	RL	Units	Method	Prep Date	Analyzed Date
TPH, Recoverable	4000		50	520	mg/kg	E418.1	22 JAN 96	23 JAN 96

Percent moisture is 4.6%. All results and limits are reported on a dry weight basis.

Aromatic Volatile Organics
Method 8020 - Mid-Level



Client Name: Parsons Engineering Science
Client ID: 125CB2 (36.00,36.50,)
LAB ID: 116842-0015-SA
Matrix: SOIL
Authorized: 19 JAN 96
Instrument: GC/PID-VKA

Sampled: 16 JAN 96
Prepared: 26 JAN 96
Dilution: 1.0

Received: 18 JAN 96
Analyzed: 26 JAN 96

Parameter	Result	Qualifier	RL	Units
Benzene	ND	G	320	ug/kg
Toluene	ND	G	320	ug/kg
Ethylbenzene	ND	G	320	ug/kg
Xylenes (total)	ND	G	320	ug/kg

Surrogate	Recovery		Acceptable Range
Bromofluorobenzene	64	%	28 - 139

Percent moisture is 22%. All results and limits are reported on a dry weight basis.

G = Reporting Limit elevated due to sample matrix interference.
ND = Not Detected



Environmental
Services

Total Extractable Petroleum Hydrocarbons
Method 8015 Modified (CADHS)

Client Name: Parsons Engineering Science
Client ID: 125CB2 (36.00,36.50,)
LAB ID: 116842-0015-SA
Matrix: SOIL
Authorized: 19 JAN 96
Instrument: GC/FID-T5

Sampled: 16 JAN 96
Prepared: 19 JAN 96
Dilution: 1.0

Received: 18 JAN 96
Analyzed: 22 JAN 96

Parameter	Result	Qualifier	RL	Units
Diesel Fuel #2	ND		13	mg/kg
Surrogate	Recovery		Acceptable Range	
Benzo(a)pyrene	72	%	50 - 150	

Percent moisture is 22%.

All results and limits are reported on a dry weight basis.

ND = Not Detected



Environmental
Services

Total Recoverable Petroleum Hydrocarbons
Method 418.1

Client Name: Parsons Engineering Science
Client ID: 125CB2 (36.00,36.50,)
LAB ID: 116842-0015-SA
Matrix: SOIL
Authorized: 19 JAN 96

Sampled: 16 JAN 96
Prepared: See Below

Received: 18 JAN 96
Analyzed: See Below

Parameter	Result	Qual	DIL	RL	Units	Method	Prep Date	Analyzed Date
TPH, Recoverable	87		1.0	13	mg/kg	E418.1	22 JAN 96	23 JAN 96

Percent moisture is 22%. All results and limits are reported on a dry weight basis.

Aromatic Volatile Organics
Method 8020



Client Name: Parsons Engineering Science

Client ID: 125CB2 (41.00,41.50,)

LAB ID: 116842-0016-SA

Matrix: SOIL

Authorized: 19 JAN 96

Instrument: GC/PID-VKA

Sampled: 16 JAN 96

Prepared: 24 JAN 96

Dilution: 1.0

Received: 18 JAN 96

Analyzed: 24 JAN 96

Parameter	Result	Qualifier	RL	Units
Benzene	ND		1.4	ug/kg
Toluene	ND		7.0	ug/kg
Ethylbenzene	ND		7.0	ug/kg
Xylenes (total)	ND		7.0	ug/kg
Surrogate	Recovery		Acceptable Range	
Bromofluorobenzene	73	%	30 - 137	

Percent moisture is 29%.

All results and limits are reported on a dry weight basis.

ND = Not Detected



Environmental
Services

Total Extractable Petroleum Hydrocarbons
Method 8015 Modified (CADHS)

Client Name: Parsons Engineering Science
Client ID: 125CB2 (41.00,41.50,)
LAB ID: 116842-0016-SA
Matrix: SOIL
Authorized: 19 JAN 96
Instrument: GC/FID-T5

Sampled: 16 JAN 96
Prepared: 19 JAN 96
Dilution: 1.0

Received: 18 JAN 96
Analyzed: 22 JAN 96

Parameter	Result	Qualifier	RL	Units
Diesel Fuel #2	ND		14	mg/kg
Surrogate	Recovery		Acceptable Range	
Benzo(a)pyrene	81	%	50 - 150	

Percent moisture is 29%.

All results and limits are reported on a dry weight basis.

ND = Not Detected



Environmental
Services

Total Recoverable Petroleum Hydrocarbons
Method 418.1

Client Name: Parsons Engineering Science
Client ID: 125CB2 (41.00,41.50,)
LAB ID: 116842-0016-SA
Matrix: SOIL
Authorized: 19 JAN 96

Sampled: 16 JAN 96
Prepared: See Below

Received: 18 JAN 96
Analyzed: See Below

Parameter	Result	Qual	DIL	RL	Units	Method	Prep Date	Analyzed Date
TPH, Recoverable	ND		1.0	14	mg/kg	E418.1	22 JAN 96	23 JAN 96

Percent moisture is 29%. All results and limits are reported on a dry weight basis.

ND = Not Detected

Aromatic Volatile Organics
Method 8020



Client Name: Parsons Engineering Science
Client ID: 125CB2 (46.00,46.50,)
LAB ID: 116842-0017-SA
Matrix: SOIL
Authorized: 19 JAN 96
Instrument: GC/PID-VKA

Sampled: 16 JAN 96
Prepared: 24 JAN 96
Dilution: 1.0

Received: 18 JAN 96
Analyzed: 24 JAN 96

Parameter	Result	Qualifier	RL	Units
Benzene	ND		1.1	ug/kg
Toluene	ND		5.5	ug/kg
Ethylbenzene	ND		5.5	ug/kg
Xylenes (total)	ND		5.5	ug/kg
Surrogate	Recovery		Acceptable Range	
Bromofluorobenzene	78	%	30 - 137	

Percent moisture is 9.1%. All results and limits are reported on a dry weight basis.

ND = Not Detected



Environmental
Services

Total Extractable Petroleum Hydrocarbons
Method 8015 Modified (CADHS)

Client Name: Parsons Engineering Science

Client ID: 125CB2 (46.00,46.50,)

LAB ID: 116842-0017-SA

Matrix: SOIL

Authorized: 19 JAN 96

Instrument: GC/FID-T5

Sampled: 16 JAN 96

Prepared: 19 JAN 96

Dilution: 1.0

Received: 18 JAN 96

Analyzed: 22 JAN 96

Parameter	Result	Qualifier	RL	Units
Diesel Fuel #2	ND		11	mg/kg
Surrogate	Recovery		Acceptable Range	
Benzo(a)pyrene	78	%	50 - 150	

Percent moisture is 9.1%. All results and limits are reported on a dry weight basis.

ND = Not Detected



Total Recoverable Petroleum Hydrocarbons
Method 418.1

Environmental
Services

Client Name: Parsons Engineering Science
Client ID: 125CB2 (46.00,46.50,)
LAB ID: 116842-0017-SA
Matrix: SOIL
Authorized: 19 JAN 96

Sampled: 16 JAN 96
Prepared: See Below

Received: 18 JAN 96
Analyzed: See Below

Parameter	Result Qual	DIL	RL	Units	Method	Prep Date	Analyzed Date
TPH, Recoverable	ND	1.0	11	mg/kg	E418.1	22 JAN 96	23 JAN 96

Percent moisture is 9.1%. All results and limits are reported on a dry weight basis.

ND = Not Detected

Aromatic Volatile Organics
Method 8020



Client Name: Parsons Engineering Science
Client ID: 125CB3 (6.00,6.50,)
LAB ID: 116842-0018-SA
Matrix: SOIL
Authorized: 19 JAN 96
Instrument: GC/PID-VKA

Sampled: 17 JAN 96
Prepared: 24 JAN 96
Dilution: 1.0

Received: 18 JAN 96
Analyzed: 24 JAN 96

Parameter	Result	Qualifier	RL	Units
Benzene	ND		1.2	ug/kg
Toluene	ND		6.0	ug/kg
Ethylbenzene	ND		6.0	ug/kg
Xylenes (total)	ND		6.0	ug/kg
Surrogate	Recovery		Acceptable Range	
Bromofluorobenzene	65	%	30 - 137	

Percent moisture is 17%. All results and limits are reported on a dry weight basis.

ND = Not Detected



Environmental
Services

Total Extractable Petroleum Hydrocarbons
Method 8015 Modified (CADHS)

Client Name: Parsons Engineering Science
Client ID: 125CB3 (6.00,6.50,)
LAB ID: 116842-0018-SA
Matrix: SOIL
Authorized: 19 JAN 96
Instrument: GC/FID-T5

Sampled: 17 JAN 96
Prepared: 19 JAN 96
Dilution: 1.0

Received: 18 JAN 96
Analyzed: 23 JAN 96

Parameter	Result	Qualifier	RL	Units
Diesel Fuel #2	ND		12	mg/kg
Surrogate	Recovery		Acceptable Range	
Benzo(a)pyrene	75	%	50 - 150	

Percent moisture is 17%. All results and limits are reported on a dry weight basis.

ND = Not Detected



Total Recoverable Petroleum Hydrocarbons
Method 418.1

Environmental
Services

Client Name: Parsons Engineering Science
Client ID: 125CB3 (6.00,6.50,)
LAB ID: 116842-0018-SA
Matrix: SOIL
Authorized: 19 JAN 96

Sampled: 17 JAN 96
Prepared: See Below

Received: 18 JAN 96
Analyzed: See Below

Parameter	Result Qual	DIL	RL	Units	Method	Prep Date	Analyzed Date
TPH, Recoverable	ND	1.0	12	mg/kg	E418.1	22 JAN 96	23 JAN 96

Percent moisture is 17%. All results and limits are reported on a dry weight basis.

ND = Not Detected

Aromatic Volatile Organics
Method 8020



Client Name: Parsons Engineering Science
Client ID: 125CB3 (25.50,26.00,)
LAB ID: 116842-0019-SA
Matrix: SOIL
Authorized: 19 JAN 96
Instrument: GC/PID-VKA

Sampled: 17 JAN 96
Prepared: 24 JAN 96
Dilution: 1.0

Received: 18 JAN 96
Analyzed: 24 JAN 96

Parameter	Result	Qualifier	RL	Units
Benzene	ND		1.1	ug/kg
Toluene	ND		5.5	ug/kg
Ethylbenzene	ND		5.5	ug/kg
Xylenes (total)	ND		5.5	ug/kg
Surrogate	Recovery		Acceptable Range	
Bromofluorobenzene	88	%	30 - 137	

Percent moisture is 9.3%. All results and limits are reported on a dry weight basis.

ND = Not Detected



Environmental
Services

Total Extractable Petroleum Hydrocarbons
Method 8015 Modified (CADHS)

Client Name: Parsons Engineering Science
Client ID: 125CB3 (25.50,26.00,)
LAB ID: 116842-0019-SA
Matrix: SOIL
Authorized: 19 JAN 96
Instrument: GC/FID-T5

Sampled: 17 JAN 96
Prepared: 19 JAN 96
Dilution: 1.0

Received: 18 JAN 96
Analyzed: 23 JAN 96

Parameter	Result	Qualifier	RL	Units
Diesel Fuel #2	ND		11	mg/kg
Surrogate	Recovery		Acceptable Range	
Benzo(a)pyrene	79	%	50 - 150	

Percent moisture is 9.3%. All results and limits are reported on a dry weight basis.

ND = Not Detected



Total Recoverable Petroleum Hydrocarbons
Method 418.1

Environmental
Services

Client Name: Parsons Engineering Science
Client ID: 125CB3 (25.50,26.00,)
LAB ID: 116842-0019-SA
Matrix: SOIL
Authorized: 19 JAN 96

Sampled: 17 JAN 96
Prepared: See Below

Received: 18 JAN 96
Analyzed: See Below

Parameter	Result Qual	DIL	RL	Units	Method	Prep Date	Analyzed Date
TPH, Recoverable	ND	1.0	11	mg/kg	E418.1	22 JAN 96	23 JAN 96

Percent moisture is 9.3%. All results and limits are reported on a dry weight basis.

ND = Not Detected

Aromatic Volatile Organics
Method 8020



Client Name: Parsons Engineering Science

Client ID: 125CB3 (40.50,41.00,)

LAB ID: 116842-0020-SA

Matrix: SOIL

Sampled: 17 JAN 96

Received: 18 JAN 96

Authorized: 19 JAN 96

Prepared: 24 JAN 96

Analyzed: 24 JAN 96

Instrument: GC/PID-VKA

Dilution: 1.0

Parameter	Result	Qualifier	RL	Units
Benzene	ND		1.4	ug/kg
Toluene	ND		7.0	ug/kg
Ethylbenzene	ND		7.0	ug/kg
Xylenes (total)	ND		7.0	ug/kg
Surrogate	Recovery		Acceptable Range	
Bromofluorobenzene	80	%	30 - 137	

Percent moisture is 29%.

All results and limits are reported on a dry weight basis.

ND = Not Detected



Environmental
Services

Total Extractable Petroleum Hydrocarbons
Method 8015 Modified (CADHS)

Client Name: Parsons Engineering Science
Client ID: 125CB3 (40.50,41.00,)
LAB ID: 116842-0020-SA
Matrix: SOIL
Authorized: 19 JAN 96
Instrument: GC/FID-T5

Sampled: 17 JAN 96
Prepared: 19 JAN 96
Dilution: 1.0

Received: 18 JAN 96
Analyzed: 23 JAN 96

Parameter	Result	Qualifier	RL	Units
Diesel Fuel #2	ND		14	mg/kg
Surrogate	Recovery		Acceptable Range	
Benzo(a)pyrene	82	%	50 - 150	

Percent moisture is 29%.

All results and limits are reported on a dry weight basis.

ND = Not Detected



Environmental
Services

GENERAL INORGANICS

Client Name: Parsons Engineering Science
Client ID: 125CB3 (45.50,46.00,)
LAB ID: 116842-0021-SA
Matrix: SOIL
Authorized: 19 JAN 96

Sampled: 17 JAN 96
Prepared: See Below

Received: 18 JAN 96
Analyzed: See Below

Parameter	Result	Qual	DIL	RL	Units	Method	Prep Date	Analyzed Date
Percent Water	7.4		1.0	0.10	%	D2216	NA	23 JAN 96



Environmental
Services

GENERAL INORGANICS

Client Name: Parsons Engineering Science
Client ID: 125CB4 (5.50,6.00,)
LAB ID: 116842-0022-SA
Matrix: SOIL
Authorized: 19 JAN 96

Sampled: 17 JAN 96
Prepared: See Below

Received: 18 JAN 96
Analyzed: See Below

Parameter	Result	Qual	DIL	RL	Units	Method	Prep Date	Analyzed Date
Percent Water	11		1.0	0.10	%	D2216	NA	23 JAN 96

GENERAL INORGANICS

Client Name: Parsons Engineering Science
Client ID: 125CB4 (5.50,6.00,)
LAB ID: 116842-0022-DU
Matrix: SOIL
Authorized: 19 JAN 96

Sampled: 17 JAN 96
Prepared: See Below

Received: 18 JAN 96
Analyzed: See Below

Parameter	Result	Qual	DIL	RL	Units	Method	Prep Date	Analyzed Date
Percent Water	11		1.0	0.10	%	D2216	NA	23 JAN 96



Environmental
Services

GENERAL INORGANICS

Client Name: Parsons Engineering Science
Client ID: 125CB4 (10.50,11.00,)
LAB ID: 116842-0023-SA
Matrix: SOIL
Authorized: 19 JAN 96

Sampled: 17 JAN 96
Prepared: See Below

Received: 18 JAN 96
Analyzed: See Below

Parameter	Result	Qual	DIL	RL	Units	Method	Prep Date	Analyzed Date
Percent Water	12		1.0	0.10	%	D2216	NA	23 JAN 96



Environmental
Services

GENERAL INORGANICS

Client Name: Parsons Engineering Science
Client ID: 125CB4 (15.50,16.00,)
LAB ID: 116842-0024-SA
Matrix: SOIL
Authorized: 19 JAN 96

Sampled: 17 JAN 96
Prepared: See Below

Received: 18 JAN 96
Analyzed: See Below

Parameter	Result	Qual	DIL	RL	Units	Method	Prep Date	Analyzed Date
Percent Water	9.1		1.0	0.10	%	D2216	NA	23 JAN 96



Environmental
Services

GENERAL INORGANICS

Client Name: Parsons Engineering Science
Client ID: 125CB4 (20.50,21.00,)
LAB ID: 116842-0025-SA
Matrix: SOIL
Authorized: 19 JAN 96

Sampled: 17 JAN 96
Prepared: See Below

Received: 18 JAN 96
Analyzed: See Below

Parameter	Result	Qual	DIL	RL	Units	Method	Prep Date	Analyzed Date
Percent Water	8.8		1.0	0.10	%	D2216	NA	23 JAN 96

GENERAL INORGANICS



Client Name: Parsons Engineering Science
Client ID: 125CB4 (30.50,31.00,)
LAB ID: 116842-0026-SA
Matrix: SOIL
Authorized: 19 JAN 96

Sampled: 17 JAN 96
Prepared: See Below

Received: 18 JAN 96
Analyzed: See Below

Parameter	Result	Qual	DIL	RL	Units	Method	Prep Date	Analyzed Date
Percent Water	3.4		1.0	0.10	%	D2216	NA	23 JAN 96



Environmental
Services

GENERAL INORGANICS

Client Name: Parsons Engineering Science
Client ID: 125CB4 (35.50,36.00,)
LAB ID: 116842-0027-SA
Matrix: SOIL
Authorized: 19 JAN 96

Sampled: 17 JAN 96
Prepared: See Below

Received: 18 JAN 96
Analyzed: See Below

Parameter	Result	Qual	DIL	RL	Units	Method	Prep Date	Analyzed Date
Percent Water	21		1.0	0.10	%	D2216	NA	23 JAN 96



GENERAL INORGANICS

Client Name: Parsons Engineering Science
Client ID: 125CB4 (45.50,46.00,)
LAB ID: 116842-0028-SA
Matrix: SOIL
Authorized: 19 JAN 96

Sampled: 17 JAN 96
Prepared: See Below

Received: 18 JAN 96
Analyzed: See Below

Parameter	Result	Qual	DIL	RL	Units	Method	Prep Date	Analyzed Date
Percent Water	9.1		1.0	0.10	%	D2216	NA	23 JAN 96



Environmental
Services

SAMPLE DESCRIPTION INFORMATION
for
Parsons Engineering Science

Lab ID	Client ID		Matrix	Sampled Date	Time	Received Date
116842-0001-SA	241CB1	(5.00,5.50,,)	SOIL	16 JAN 96	10:25	18 JAN 96
116842-0002-SA	241CB1	(7.00,7.50,,)	SOIL	16 JAN 96	10:40	18 JAN 96
116842-0003-SA	241CB1	(9.00,9.50,,)	SOIL	16 JAN 96	10:50	18 JAN 96
116842-0003-MS	241CB1	(9.00,9.50,)MS	SOIL	16 JAN 96	10:50	18 JAN 96
116842-0003-SD	241CB1	(9.00,9.50,)MSD	SOIL	16 JAN 96	10:50	18 JAN 96
116842-0003-DU	241CB1	(9.00,9.50,,)	SOIL	16 JAN 96	10:50	18 JAN 96
116842-0004-SA	125CB1	(15.00,15.50,,)	SOIL	16 JAN 96	13:28	18 JAN 96
116842-0005-SA	125CB1	(25.00,25.50,,)	SOIL	16 JAN 96	13:35	18 JAN 96
116842-0006-SA	125CB1	(35.00,35.50,,)	SOIL	16 JAN 96	13:47	18 JAN 96
116842-0007-SA	125CB1	(40.00,40.50,,)	SOIL	16 JAN 96	13:55	18 JAN 96
116842-0008-SA	125CB1	(45.00,45.50,,)	SOIL	16 JAN 96	14:04	18 JAN 96
116842-0009-SA	125CB2	(5.00,5.50,,)	SOIL	16 JAN 96	14:50	18 JAN 96
116842-0010-SA	125CB2	(13.50,14.00,,)	SOIL	16 JAN 96	15:01	18 JAN 96
116842-0011-SA	125CB2	(16.00,16.50,,)	SOIL	16 JAN 96	15:14	18 JAN 96
116842-0012-SA	125CB2	(21.00,21.50,,)	SOIL	16 JAN 96	15:19	18 JAN 96
116842-0013-SA	125CB2	(26.00,26.50,,)	SOIL	16 JAN 96	15:26	18 JAN 96
116842-0014-SA	125CB2	(31.00,31.50,,)	SOIL	16 JAN 96	15:31	18 JAN 96
116842-0015-SA	125CB2	(36.00,36.50,,)	SOIL	16 JAN 96	15:37	18 JAN 96
116842-0016-SA	125CB2	(41.00,41.50,,)	SOIL	16 JAN 96	15:42	18 JAN 96
116842-0017-SA	125CB2	(46.00,46.50,,)	SOIL	16 JAN 96	15:49	18 JAN 96
116842-0018-SA	125CB3	(6.00,6.50,,)	SOIL	17 JAN 96	08:40	18 JAN 96
116842-0019-SA	125CB3	(25.50,26.00,,)	SOIL	17 JAN 96	08:59	18 JAN 96
116842-0020-SA	125CB3	(40.50,41.00,,)	SOIL	17 JAN 96	09:20	18 JAN 96
116842-0021-SA	125CB3	(45.50,46.00,,)	SOIL	17 JAN 96	09:27	18 JAN 96
116842-0022-SA	125CB4	(5.50,6.00,,)	SOIL	17 JAN 96	10:27	18 JAN 96
116842-0022-MS	125CB4	(5.50,6.00,)MS	SOIL	17 JAN 96	10:27	18 JAN 96
116842-0022-SD	125CB4	(5.50,6.00,)MSD	SOIL	17 JAN 96	10:27	18 JAN 96
116842-0022-DU	125CB4	(5.50,6.00,,)	SOIL	17 JAN 96	10:27	18 JAN 96
116842-0023-SA	125CB4	(10.50,11.00,,)	SOIL	17 JAN 96	10:35	18 JAN 96
116842-0024-SA	125CB4	(15.50,16.00,,)	SOIL	17 JAN 96	10:38	18 JAN 96
116842-0024-MS	125CB4	(15.50,16.00,)MS	SOIL	17 JAN 96	10:38	18 JAN 96
116842-0024-SD	125CB4	(15.50,16.00,)MSD	SOIL	17 JAN 96	10:38	18 JAN 96
116842-0025-SA	125CB4	(20.50,21.00,,)	SOIL	17 JAN 96	10:41	18 JAN 96
116842-0026-SA	125CB4	(30.50,31.00,,)	SOIL	17 JAN 96	10:51	18 JAN 96
116842-0027-SA	125CB4	(35.50,36.00,,)	SOIL	17 JAN 96	10:57	18 JAN 96
116842-0028-SA	125CB4	(45.50,46.00,,)	SOIL	17 JAN 96	11:08	18 JAN 96
116842-0029-SA	125CB5	(10.00,10.50,,)	SOIL	17 JAN 96	15:00	18 JAN 96
116842-0030-EB	EQUIPMENT RINSEATE	(0.00,0.00,,)	WATER-QA	17 JAN 96	11:20	18 JAN 96
116842-0031-TB	TRIP BLANK	(0.00,0.00,,)	WATER-QA	17 JAN 96		18 JAN 96

Aromatic Volatile Organics
Method 8020



Client Name: Parsons Engineering Science
Client ID: TRIP BLANK (0.00,0.00,)
LAB ID: 116842-0031-TB
Matrix: WATER-QA
Authorized: 19 JAN 96
Instrument: GC/PID-VKA

Sampled: 17 JAN 96
Prepared: 22 JAN 96
Dilution: 1.0

Received: 18 JAN 96
Analyzed: 22 JAN 96

Parameter	Result	Qualifier	RL	Units
Benzene	ND		0.50	ug/L
Toluene	ND		1.0	ug/L
Ethylbenzene	ND		1.0	ug/L
Xylenes (total)	ND		1.0	ug/L
Surrogate	Recovery		Acceptable Range	
Bromofluorobenzene	80	%	29 - 137	

ND = Not Detected

Aromatic Volatile Organics
Method 8020



Client Name: Parsons Engineering Science
Client ID: EQUIPMENT RINSEATE (0.00,0.00,)
LAB ID: 116842-0030-EB
Matrix: WATER-QA
Authorized: 19 JAN 96
Instrument: GC/PID-VKA

Sampled: 17 JAN 96
Prepared: 22 JAN 96
Dilution: 1.0

Received: 18 JAN 96
Analyzed: 22 JAN 96

Parameter	Result	Qualifier	RL	Units
Benzene	ND		0.50	ug/L
Toluene	ND		1.0	ug/L
Ethylbenzene	ND		1.0	ug/L
Xylenes (total)	ND		1.0	ug/L
Surrogate	Recovery		Acceptable Range	
Bromofluorobenzene	81	%	29 - 137	

ND = Not Detected



Environmental
Services

Total Extractable Petroleum Hydrocarbons
Method 8015 Modified (CADHS)

Client Name: Parsons Engineering Science
Client ID: EQUIPMENT RINSEATE (0.00,0.00,)
LAB ID: 116842-0030-EB
Matrix: WATER-QA
Authorized: 19 JAN 96
Instrument: GC/FID

Sampled: 17 JAN 96
Prepared: 22 JAN 96
Dilution: 1.0

Received: 18 JAN 96
Analyzed: 24 JAN 96

Parameter	Result	Qualifier	RL	Units
Diesel Fuel #2	ND		1.0	mg/L
Surrogate	Recovery		Acceptable Range	
Benzo(a)pyrene	92	%	50 - 150	

ND = Not Detected



Total Recoverable Petroleum Hydrocarbons
Method 418.1

Environmental
Services

Client Name: Parsons Engineering Science
Client ID: EQUIPMENT RINSEATE (0.00,0.00,)
LAB ID: 116842-0030-EB
Matrix: WATER-QA
Authorized: 19 JAN 96

Sampled: 17 JAN 96
Prepared: See Below

Received: 18 JAN 96
Analyzed: See Below

Parameter	Result Qual	DIL	RL	Units	Method	Prep Date	Analyzed Date
TPH, Recoverable	ND	1.0	1.0	mg/L	E418.1	23 JAN 96	23 JAN 96

ND = Not Detected

METHOD BLANK REPORT
LUFT
Project: 116842

Test: TEPH-EAFB-S
Matrix: SOLID
QC Run: 19 JAN 96-DX

Method CADHS - Total Extractable Petroleum Hydrocarbons

Analyte	Result	Units	Date Analyzed: 22 JAN 96 Reporting Limit
Diesel Fuel #2	ND	mg/kg	10

QC Run: 19 JAN 96-EX

Analyte	Result	Units	Date Analyzed: 23 JAN 96 Reporting Limit
Diesel Fuel #2	ND	mg/kg	10

Test: TEPH-EAFB-A
Matrix: AQUEOUS
QC Run: 22 JAN 96-B

Method CADHS - Total Extractable Petroleum Hydrocarbons

Analyte	Result	Units	Date Analyzed: 24 JAN 96 Reporting Limit
Diesel Fuel #2	ND	mg/L	1.0

Test: TVPH-EAFB-S
Matrix: SOLID
QC Run: 23 JAN 96-AAX

Method CADHS - Total Volatile Petroleum Hydrocarbons

Analyte	Result	Units	Date Analyzed: 23 JAN 96 Reporting Limit
Gasoline	ND	mg/kg	1.0

Test: TVPH-EAFB-A
Matrix: AQUEOUS
QC Run: 22 JAN 96-AC

Method CADHS - Total Volatile Petroleum Hydrocarbons

Analyte	Result	Units	Date Analyzed: 22 JAN 96 Reporting Limit
Gasoline	ND	mg/L	0.10

ND = Not Detected

QC LOT ASSIGNMENT REPORT - MS QC
GC/MS Preparation

Laboratory Sample Number	QC Matrix	QC Category	QC Lot Number (DCS)	QC Run Number (SCS/BLANK/LCS)	MS QC Run Number (SA,MS,SD,DU)
116842-0001-SA	SOLID	MOISTURE-S			22 JAN 96-AA
116842-0002-SA	SOLID	MOISTURE-S			22 JAN 96-AA
116842-0003-DU	SOLID	MOISTURE-S			22 JAN 96-AA
116842-0003-SA	SOLID	MOISTURE-S			22 JAN 96-AA
116842-0004-SA	SOLID	MOISTURE-S			22 JAN 96-AA
116842-0005-SA	SOLID	MOISTURE-S			22 JAN 96-AA
116842-0006-SA	SOLID	MOISTURE-S			22 JAN 96-AA
116842-0007-SA	SOLID	MOISTURE-S			22 JAN 96-AA
116842-0008-SA	SOLID	MOISTURE-S			22 JAN 96-AA
116842-0009-SA	SOLID	MOISTURE-S			22 JAN 96-AA
116842-0010-SA	SOLID	MOISTURE-S			22 JAN 96-AA
116842-0011-SA	SOLID	MOISTURE-S			22 JAN 96-AA
116842-0012-SA	SOLID	MOISTURE-S			22 JAN 96-AA
116842-0013-SA	SOLID	MOISTURE-S			22 JAN 96-AA
116842-0014-SA	SOLID	MOISTURE-S			22 JAN 96-AA
116842-0015-SA	SOLID	MOISTURE-S			22 JAN 96-AA
116842-0016-SA	SOLID	MOISTURE-S			22 JAN 96-AA
116842-0017-SA	SOLID	MOISTURE-S			22 JAN 96-AA
116842-0018-SA	SOLID	MOISTURE-S			22 JAN 96-AA
116842-0019-SA	SOLID	MOISTURE-S			22 JAN 96-AA
116842-0020-SA	SOLID	MOISTURE-S			22 JAN 96-AA
116842-0021-SA	SOLID	MOISTURE-S			22 JAN 96-BA
116842-0022-DU	SOLID	MOISTURE-S			22 JAN 96-BA
116842-0022-SA	SOLID	MOISTURE-S			22 JAN 96-BA
116842-0023-SA	SOLID	MOISTURE-S			22 JAN 96-BA
116842-0024-SA	SOLID	MOISTURE-S			22 JAN 96-BA
116842-0025-SA	SOLID	MOISTURE-S			22 JAN 96-BA
116842-0026-SA	SOLID	MOISTURE-S			22 JAN 96-BA
116842-0027-SA	SOLID	MOISTURE-S			22 JAN 96-BA
116842-0028-SA	SOLID	MOISTURE-S			22 JAN 96-BA
116842-0029-SA	SOLID	MOISTURE-S			22 JAN 96-BA

MATRIX DUPLICATE QC REPORT
GC/MS Preparation
Project: 116842

Category: MOISTURE-S Percent Moisture
Matrix: SOLID
Sample: 116842-0003
MS Run: 22 JAN 96-AA
Units: %

Analyte	Concentration		%RPD SA-DU	Acceptance Limit
	Sample	Duplicate		
Percent Water	21.5	22.6	5.0	10

Category: MOISTURE-S Percent Moisture
Matrix: SOLID
Sample: 116842-0022
MS Run: 22 JAN 96-BA
Units: %

Analyte	Concentration		%RPD SA-DU	Acceptance Limit
	Sample	Duplicate		
Percent Water	11.4	11.3	0.88	10

Calculations are performed before rounding to avoid round-off errors in calculated results.

QC LOT ASSIGNMENT REPORT - MS QC
Metals Analysis and Preparation

Laboratory Sample Number	QC Matrix	QC Category	QC Lot Number (DCS)	QC Run Number (SCS/BLANK/LCS)	MS QC Run Number (SA,MS,SD,DU)
116842-0001-SA	SOLID	PBGF-EAF-S		22 JAN 96-AX	22 JAN 96-AA
116842-0002-SA	SOLID	PBGF-EAF-S		22 JAN 96-AX	22 JAN 96-AA
116842-0003-MS	SOLID	PBGF-EAF-S		22 JAN 96-AX	22 JAN 96-AA
116842-0003-SA	SOLID	PBGF-EAF-S		22 JAN 96-AX	22 JAN 96-AA
116842-0003-SD	SOLID	PBGF-EAF-S		22 JAN 96-AX	22 JAN 96-AA

LABORATORY CONTROL SAMPLE REPORT
Metals Analysis and Preparation
Project: 116842

Category: PBGF-EAF-S Method SW7741 - Lead, GFAA

Matrix: SOLID

Date Analyzed: 23 JAN 96

QC Run: 22 JAN 96-AX

Concentration Units: mg/kg

Analyte	Concentration		Accuracy(%)	
	Spiked	Measured	LCS	Limits
Lead	53.5	65.6	123	53-139

Calculations are performed before rounding to avoid round-off errors in calculated results.

MATRIX SPIKE/MATRIX SPIKE DUPLICATE QC REPORT
Metals Analysis and Preparation
Project: 116842

Category: PBGF-EAF-S Method SW7741 - Lead, GFAA
Matrix: SOLID
Sample: 116842-0003
MS Run: 22 JAN 96-AA
Units mg/kg Units Qualifier: Wet weight

Analyte	Sample Result	Concentration		Amount Spiked MS/MSD	%Recovery		%RPD	Acceptance Limit	
		MS Result	MSD Result		MS	MSD		Recov.	RPD
Lead	11.9	14.0 n	13.2 n	2.00	NC	NC	NC	41-124	50

n = Spiked analyte out of matrix spike acceptance limits; refer to lab control sample results.
NC = Not Calculated, calculation not applicable.

Calculations are performed before rounding to avoid round-off errors in calculated results.

METHOD BLANK REPORT
Metals Analysis and Preparation
Project: 116842

Test: PB-GFAA-EAFB-S
Matrix: SOLID
QC Run: 22 JAN 96-AX

Method SW7421 - Lead, Graphite Furnace AA

Date Analyzed: 23 JAN 96

Analyte

Result

Units

Reporting
Limit

Lead

ND

mg/kg

0.50

ND = Not Detected

QC LOT ASSIGNMENT REPORT - MS QC
Wet Chemistry Analysis and Preparation

Laboratory Sample Number	QC Matrix	QC Category	QC Lot Number (DCS)	QC Run Number (SCS/BLANK/LCS)	MS QC Run Number (SA,MS,SD,DU)
116842-0004-SA	SOLID	TRPH-EAF-S		24 JAN 96-AX	22 JAN 96-AB
116842-0005-SA	SOLID	TRPH-EAF-S		24 JAN 96-AX	22 JAN 96-AB
116842-0006-SA	SOLID	TRPH-EAF-S		24 JAN 96-AX	22 JAN 96-AB
116842-0007-SA	SOLID	TRPH-EAF-S		24 JAN 96-AX	22 JAN 96-AB
116842-0008-SA	SOLID	TRPH-EAF-S		24 JAN 96-AX	22 JAN 96-AB
116842-0009-SA	SOLID	TRPH-EAF-S		24 JAN 96-AX	22 JAN 96-AB
116842-0010-SA	SOLID	TRPH-EAF-S		24 JAN 96-AX	22 JAN 96-AB
116842-0011-SA	SOLID	TRPH-EAF-S		24 JAN 96-AX	22 JAN 96-AB
116842-0012-SA	SOLID	TRPH-EAF-S		24 JAN 96-AX	22 JAN 96-AB
116842-0013-SA	SOLID	TRPH-EAF-S		22 JAN 96-AX	22 JAN 96-AA
116842-0014-SA	SOLID	TRPH-EAF-S		22 JAN 96-AX	22 JAN 96-AA
116842-0015-SA	SOLID	TRPH-EAF-S		22 JAN 96-AX	22 JAN 96-AA
116842-0016-SA	SOLID	TRPH-EAF-S		22 JAN 96-AX	22 JAN 96-AA
116842-0017-SA	SOLID	TRPH-EAF-S		22 JAN 96-AX	22 JAN 96-AA
116842-0018-SA	SOLID	TRPH-EAF-S		22 JAN 96-AX	22 JAN 96-AA
116842-0019-SA	SOLID	TRPH-EAF-S		22 JAN 96-AX	22 JAN 96-AA
116842-0020-SA	SOLID	TRPH-EAF-S		22 JAN 96-AX	22 JAN 96-AA
116842-0021-SA	SOLID	TRPH-EAF-S		22 JAN 96-AX	22 JAN 96-AA
116842-0022-MS	SOLID	TRPH-EAF-S		22 JAN 96-AX	22 JAN 96-AA
116842-0022-SA	SOLID	TRPH-EAF-S		22 JAN 96-AX	22 JAN 96-AA
116842-0022-SD	SOLID	TRPH-EAF-S		22 JAN 96-AX	22 JAN 96-AA
116842-0023-SA	SOLID	TRPH-EAF-S		22 JAN 96-AX	22 JAN 96-AA
116842-0024-MS	SOLID	TRPH-EAF-S		22 JAN 96-AX	22 JAN 96-AB
116842-0024-SA	SOLID	TRPH-EAF-S		22 JAN 96-AX	22 JAN 96-AB
116842-0024-SD	SOLID	TRPH-EAF-S		22 JAN 96-AX	22 JAN 96-AB
116842-0025-SA	SOLID	TRPH-EAF-S		22 JAN 96-AX	22 JAN 96-AB
116842-0026-SA	SOLID	TRPH-EAF-S		22 JAN 96-AX	22 JAN 96-AB
116842-0027-SA	SOLID	TRPH-EAF-S		22 JAN 96-AX	22 JAN 96-AB
116842-0028-SA	SOLID	TRPH-EAF-S		22 JAN 96-AX	22 JAN 96-AB
116842-0029-SA	SOLID	TRPH-EAF-S		22 JAN 96-AX	22 JAN 96-AB
116842-0030-EB	AQUEOUS	TRPH-EAF-A	23 JAN 96-A	23 JAN 96-A	

DUPLICATE CONTROL SAMPLE REPORT
Wet Chemistry Analysis and Preparation
Project: 116842

Category: TRPH-EAF-A Method E418.1 - Total Petroleum Hydrocarbons, Recoverable

Matrix: AQUEOUS

QC Lot: 23 JAN 96-A

Date Analyzed: 23 JAN 96

Concentration Units: mg/L

Analyte	Spiked	Concentration		Measured		AVG	Accuracy		Precision	
		DCS1	Qual	DCS2	Qual		DCS	Average(%) Limits	(RPD)	DCS Limit
TPH, Recoverable	8.00	7.60		7.30		7.45	93	80-113	4.0	9

Calculations are performed before rounding to avoid round-off errors in calculated results.

LABORATORY CONTROL SAMPLE REPORT
Wet Chemistry Analysis and Preparation
Project: 116842

Category: TRPH-EAF-S Method E418.1 - Total Petroleum Hydrocarbons, Recoverable
Matrix: SOLID Date Analyzed: 25 JAN 96
QC Run: 24 JAN 96-AX
Concentration Units: mg/kg

Analyte	Concentration		Accuracy(%)	
	Spiked	Measured	LCS	Limits
TPH, Recoverable	40.0	40.4	101	74-124

Category: TRPH-EAF-S Method E418.1 - Total Petroleum Hydrocarbons, Recoverable
Matrix: SOLID Date Analyzed: 23 JAN 96
QC Run: 22 JAN 96-AX
Concentration Units: mg/kg

Analyte	Concentration		Accuracy(%)	
	Spiked	Measured	LCS	Limits
TPH, Recoverable	40.0	41.0	102	74-124

MATRIX SPIKE/MATRIX SPIKE DUPLICATE QC REPORT
Wet Chemistry Analysis and Preparation
Project: 116842

Category: TRPH-EAF-S Method E418.1 - Total Petroleum Hydrocarbons, Recoverable

Matrix: SOLID

Sample: 116842-0024

MS Run: 22 JAN 96-AB

Units mg/kg Units Qualifier: Wet weight

Concentration

Analyte	Sample Result	MS Result	MSD Result	Amount Spiked MS/MSD	%Recovery		%RPD	Acceptance Limit	
					MS	MSD		Recov.	RPD
TPH, Recoverable	ND	38.0	34.6	40.0	95	86	9.4	61-130	12

Category: TRPH-EAF-S Method E418.1 - Total Petroleum Hydrocarbons, Recoverable

Matrix: SOLID

Sample: 116842-0022

MS Run: 22 JAN 96-AA

Units mg/kg Units Qualifier: Wet weight

Concentration

Analyte	Sample Result	MS Result	MSD Result	Amount Spiked MS/MSD	%Recovery		%RPD	Acceptance Limit	
					MS	MSD		Recov.	RPD
TPH, Recoverable	ND	36.4	39.2	40.0	91	98	7.4	61-130	12

ND = Not Detected

Calculations are performed before rounding to avoid round-off errors in calculated results.

METHOD BLANK REPORT
Wet Chemistry Analysis and Preparation
Project: 116842

Test: TRPH-EAFB-S Method E418.1 - Total Petroleum Hydrocarbons, Recoverable
Matrix: SOLID
QC Run: 24 JAN 96-AX Date Analyzed: 25 JAN 96

Analyte	Result	Units	Reporting Limit
TPH, Recoverable	ND	mg/kg	10

QC Run: 22 JAN 96-AX Date Analyzed: 23 JAN 96

Analyte	Result	Units	Reporting Limit
TPH, Recoverable	ND	mg/kg	10

Test: TRPH-EAFB-A Method E418.1 - Total Petroleum Hydrocarbons, Recoverable
Matrix: AQUEOUS
QC Run: 23 JAN 96-A Date Analyzed: 23 JAN 96

Analyte	Result	Units	Reporting Limit
TPH, Recoverable	ND	mg/L	1.0

ND = Not Detected

QC LOT ASSIGNMENT REPORT - MS QC
LUFT

Laboratory Sample Number	QC Matrix	QC Category	QC Lot Number (DCS)	QC Run Number (SCS/BLANK/LCS)	MS QC Run Number (SA, MS, SD, DU)
116842-0001-SA	SOLID	TVPH-EDW-S		23 JAN 96-AAX	23 JAN 96-AB
116842-0002-SA	SOLID	TVPH-EDW-S		23 JAN 96-AAX	23 JAN 96-AB
116842-0003-MS	SOLID	TVPH-EDW-S		23 JAN 96-AAX	23 JAN 96-AB
116842-0003-SA	SOLID	TVPH-EDW-S		23 JAN 96-AAX	23 JAN 96-AB
116842-0003-SD	SOLID	TVPH-EDW-S		23 JAN 96-AAX	23 JAN 96-AB
116842-0004-SA	SOLID	TEPH-EDW-S		19 JAN 96-DX	19 JAN 96-DA
116842-0005-SA	SOLID	TEPH-EDW-S		19 JAN 96-DX	19 JAN 96-DA
116842-0006-SA	SOLID	TEPH-EDW-S		19 JAN 96-DX	19 JAN 96-DA
116842-0007-SA	SOLID	TEPH-EDW-S		19 JAN 96-DX	19 JAN 96-DA
116842-0008-SA	SOLID	TEPH-EDW-S		19 JAN 96-DX	19 JAN 96-DA
116842-0009-SA	SOLID	TEPH-EDW-S		19 JAN 96-DX	19 JAN 96-DA
116842-0010-SA	SOLID	TEPH-EDW-S		19 JAN 96-DX	19 JAN 96-DA
116842-0011-SA	SOLID	TEPH-EDW-S		19 JAN 96-DX	19 JAN 96-DA
116842-0012-SA	SOLID	TEPH-EDW-S		19 JAN 96-DX	19 JAN 96-DA
116842-0013-SA	SOLID	TEPH-EDW-S		19 JAN 96-DX	19 JAN 96-DA
116842-0014-SA	SOLID	TEPH-EDW-S		19 JAN 96-DX	19 JAN 96-DA
116842-0015-SA	SOLID	TEPH-EDW-S		19 JAN 96-DX	19 JAN 96-DA
116842-0016-SA	SOLID	TEPH-EDW-S		19 JAN 96-DX	19 JAN 96-DA
116842-0017-SA	SOLID	TEPH-EDW-S		19 JAN 96-DX	19 JAN 96-DA
116842-0018-SA	SOLID	TEPH-EDW-S		19 JAN 96-DX	19 JAN 96-DA
116842-0019-SA	SOLID	TEPH-EDW-S		19 JAN 96-DX	19 JAN 96-DA
116842-0020-SA	SOLID	TEPH-EDW-S		19 JAN 96-DX	19 JAN 96-DA
116842-0021-SA	SOLID	TEPH-EDW-S		19 JAN 96-DX	19 JAN 96-DA
116842-0022-MS	SOLID	TEPH-EDW-S		19 JAN 96-DX	19 JAN 96-DA
116842-0022-SA	SOLID	TEPH-EDW-S		19 JAN 96-DX	19 JAN 96-DA
116842-0022-SD	SOLID	TEPH-EDW-S		19 JAN 96-DX	19 JAN 96-DA
116842-0023-SA	SOLID	TEPH-EDW-S		19 JAN 96-DX	19 JAN 96-DA
116842-0024-MS	SOLID	TEPH-EDW-S		19 JAN 96-EX	19 JAN 96-EA
116842-0024-SA	SOLID	TEPH-EDW-S		19 JAN 96-EX	19 JAN 96-EA
116842-0024-SD	SOLID	TEPH-EDW-S		19 JAN 96-EX	19 JAN 96-EA
116842-0025-SA	SOLID	TEPH-EDW-S		19 JAN 96-EX	19 JAN 96-EA
116842-0026-SA	SOLID	TEPH-EDW-S		19 JAN 96-EX	19 JAN 96-EA
116842-0027-SA	SOLID	TEPH-EDW-S		19 JAN 96-EX	19 JAN 96-EA
116842-0028-SA	SOLID	TEPH-EDW-S		19 JAN 96-EX	19 JAN 96-EA
116842-0029-SA	SOLID	TEPH-EDW-S		19 JAN 96-EX	19 JAN 96-EA
116842-0030-EB	AQUEOUS	TEPH-EDW-A	22 JAN 96-B	22 JAN 96-B	
116842-0030-EB	AQUEOUS	TVPH-EDW-A	22 JAN 96-AC	22 JAN 96-AC	
116842-0031-TB	AQUEOUS	TVPH-EDW-A	22 JAN 96-AC	22 JAN 96-AC	

DUPLICATE CONTROL SAMPLE REPORT
LUFT
Project: 116842

Category: TEPH-EDW-A Method CADHS - Total Extractable Petroleum Hydrocarbons

Matrix: AQUEOUS

QC Lot: 22 JAN 96-B

Date Analyzed: 24 JAN 96

Concentration Units: mg/L

Analyte	Spiked	Concentration				Accuracy		Precision	
		Measured		AVG		Average (%)		(RPD)	
		DCS1 Qual	DCS2 Qual			DCS	Limits	DCS	Limit
Diesel Fuel #2	5.00	4.82	4.50	4.66		93	34-134	7.0	33
Benzo(a)pyrene	0.250	0.233	0.216	0.224		90	50-150	7.6	0

Category: TVPH-EDW-A Method CADHS - Total Volatile Petroleum Hydrocarbons

Matrix: AQUEOUS

QC Lot: 22 JAN 96-AC

Date Analyzed: 22 JAN 96

Concentration Units: mg/L

Analyte	Spiked	Concentration				Accuracy		Precision	
		Measured		AVG		Average (%)		(RPD)	
		DCS1 Qual	DCS2 Qual			DCS	Limits	DCS	Limit
Gasoline	1.00	0.779	0.795	0.787		79	40-150	2.0	28
a,a,a-Trifluorotoluene	0.0400	0.0462	0.0468	0.0465		116	50-150	1.2	0

Calculations are performed before rounding to avoid round-off errors in calculated results.

LABORATORY CONTROL SAMPLE REPORT

LUFT

Project: 116842

Category: TEPH-EDW-S Method CADHS - Total Extractable Petroleum Hydrocarbons
Matrix: SOLID Date Analyzed: 22 JAN 96
QC Run: 19 JAN 96-DX
Concentration Units: mg/kg

Analyte	Concentration		Accuracy(%)	
	Spiked	Measured	LCS	Limits
Diesel Fuel #2	250	234	94	42-146
Benzo(a)pyrene	12.5	11.6	92	50-150

Category: TEPH-EDW-S Method CADHS - Total Extractable Petroleum Hydrocarbons
Matrix: SOLID Date Analyzed: 23 JAN 96
QC Run: 19 JAN 96-EX
Concentration Units: mg/kg

Analyte	Concentration		Accuracy(%)	
	Spiked	Measured	LCS	Limits
Diesel Fuel #2	250	233	93	42-146
Benzo(a)pyrene	12.5	11.6	93	50-150

Category: TVPH-EDW-S Method CADHS - Total Volatile Petroleum Hydrocarbons
Matrix: SOLID Date Analyzed: 23 JAN 96
QC Run: 23 JAN 96-AAX
Concentration Units: mg/kg

Analyte	Concentration		Accuracy(%)	
	Spiked	Measured	LCS	Limits
Gasoline	5.00	4.41	88	67-126
a,a,a-Trifluorotoluene	0.200	0.167	84	50-150

Calculations are performed before rounding to avoid round-off errors in calculated results.



Environmental
Services

MATRIX SPIKE/MATRIX SPIKE DUPLICATE QC REPORT

LUFT

Project: 116842

Category: TEPH-EDW-S Method CADHS - Total Extractable Petroleum Hydrocarbons

Matrix: SOLID

Sample: 116842-0022

MS Run: 19 JAN 96-DA

Units mg/kg Units Qualifier: Wet weight

Analyte	Sample Result	Concentration		Amount Spiked MS/MSD	%Recovery		%RPD	Acceptance Limit	
		MS Result	MSD Result		MS	MSD		Recov.	RPD
Diesel Fuel #2	ND	207	209	250	83	84	1.0	10-178	42

Surrogates	Sample %Recovery	%Recovery MS	MSD	Acceptance Limit Recovery
Benzo (a) pyrene	82	85	85	50-150

Category: TEPH-EDW-S Method CADHS - Total Extractable Petroleum Hydrocarbons

Matrix: SOLID

Sample: 116842-0024

MS Run: 19 JAN 96-EA

Units mg/kg Units Qualifier: Wet weight

Analyte	Sample Result	Concentration		Amount Spiked MS/MSD	%Recovery		%RPD	Acceptance Limit	
		MS Result	MSD Result		MS	MSD		Recov.	RPD
Diesel Fuel #2	ND	197	191	250	79	76	3.2	10-178	42

Surrogates	Sample %Recovery	%Recovery MS	MSD	Acceptance Limit Recovery
Benzo (a) pyrene	84	79	76	50-150

Category: TVPH-EDW-S Method CADHS - Total Volatile Petroleum Hydrocarbons

Matrix: SOLID

Sample: 116842-0003

MS Run: 23 JAN 96-AB

Units mg/kg Units Qualifier: Wet weight

Analyte	Sample Result	Concentration		Amount Spiked MS/MSD	%Recovery		%RPD	Acceptance Limit	
		MS Result	MSD Result		MS	MSD		Recov.	RPD
Gasoline	ND	3.68	3.54	5.00	74	71	4.1	50-126	35

ND = Not Detected

Calculations are performed before rounding to avoid round-off errors in calculated results.

MATRIX SPIKE/MATRIX SPIKE DUPLICATE QC REPORT
LUFT
Project: 116842 (cont.)

Surrogates	Sample %Recovery	%Recovery		Acceptance Limit Recovery
		MS	MSD	
a,a,a-Trifluorotoluene	77	74	72	50-150

Calculations are performed before rounding to avoid round-off errors in calculated results.

SINGLE CONTROL SAMPLE REPORT
LUFT
Project: 116842

Category: TEPH-EDW-S Method CADHS - Total Extractable Petroleum Hydrocarbons
Matrix: SOLID
QC Run: 19 JAN 96-DX Date Analyzed: 22 JAN 96
Concentration Units: mg/kg

Analyte	Concentration		Accuracy(%)	
	Spiked	Measured	SCS	Limits
Benzo(a)pyrene	12.5	11.4	91	50-150

Category: TEPH-EDW-S Method CADHS - Total Extractable Petroleum Hydrocarbons
Matrix: SOLID
QC Run: 19 JAN 96-EX Date Analyzed: 23 JAN 96
Concentration Units: mg/kg

Analyte	Concentration		Accuracy(%)	
	Spiked	Measured	SCS	Limits
Benzo(a)pyrene	12.5	11.3	91	50-150

Category: TEPH-EDW-A Method CADHS - Total Extractable Petroleum Hydrocarbons
Matrix: AQUEOUS
QC Run: 22 JAN 96-B Date Analyzed: 24 JAN 96
Concentration Units: mg/L

Analyte	Concentration		Accuracy(%)	
	Spiked	Measured	SCS	Limits
Benzo(a)pyrene	0.250	0.217	87	50-150

Category: TVPH-EDW-S Method CADHS - Total Volatile Petroleum Hydrocarbons
Matrix: SOLID
QC Run: 23 JAN 96-AAX Date Analyzed: 23 JAN 96
Concentration Units: mg/kg

Analyte	Concentration		Accuracy(%)	
	Spiked	Measured	SCS	Limits
a,a,a-Trifluorotoluene	0.200	0.179	89	50-150

Calculations are performed before rounding to avoid round-off errors in calculated results.

SINGLE CONTROL SAMPLE REPORT
LUFT
Project: 116842 (cont.)

Category: TVPH-EDW-A Method CADHS - Total Volatile Petroleum Hydrocarbons

Matrix: AQUEOUS

QC Run: 22 JAN 96-AC

Date Analyzed: 22 JAN 96

Concentration Units: mg/L

Analyte	Concentration		Accuracy(%)	
	Spiked	Measured	SCS	Limits
a,a,a-Trifluorotoluene	0.0400	0.0462	115	50-150

Calculations are performed before rounding to avoid round-off errors in calculated results.

METHOD BLANK REPORT
LUFT
Project: 116842

Test: TEPH-EAFB-S Method CADHS - Total Extractable Petroleum Hydrocarbons
Matrix: SOLID
QC Run: 19 JAN 96-DX Date Analyzed: 22 JAN 96
Reporting Limit

Analyte	Result	Units	Limit
Diesel Fuel #2	ND	mg/kg	10
Unknown extractable hydrocarbon	ND	mg/kg	10

QC Run: 19 JAN 96-EX Date Analyzed: 23 JAN 96
Reporting Limit

Analyte	Result	Units	Limit
Diesel Fuel #2	ND	mg/kg	10
Unknown extractable hydrocarbon	ND	mg/kg	10

Test: TEPH-EAFB-A Method CADHS - Total Extractable Petroleum Hydrocarbons
Matrix: AQUEOUS
QC Run: 22 JAN 96-B Date Analyzed: 24 JAN 96
Reporting Limit

Analyte	Result	Units	Limit
Diesel Fuel #2	ND	mg/L	1.0
Unknown extractable hydrocarbon	ND	mg/L	1.0

Test: TVPH-EAFB-S Method CADHS - Total Volatile Petroleum Hydrocarbons
Matrix: SOLID
QC Run: 23 JAN 96-AAX Date Analyzed: 23 JAN 96
Reporting Limit

Analyte	Result	Units	Limit
Gasoline	ND	mg/kg	1.0
Unknown volatile hydrocarbon	ND	mg/kg	1.0

Test: TVPH-EAFB-A Method CADHS - Total Volatile Petroleum Hydrocarbons
Matrix: AQUEOUS
QC Run: 22 JAN 96-AC Date Analyzed: 22 JAN 96
Reporting Limit

Analyte	Result	Units	Limit
Gasoline	ND	mg/L	0.10
Unknown volatile hydrocarbon	ND	mg/L	0.10

ND = Not Detected

QC LOT ASSIGNMENT REPORT - MS QC
Volatile Organics by GC

Laboratory Sample Number	QC Matrix	QC Category	QC Lot Number (DCS)	QC Run Number (SCS/BLANK/LCS)	MS QC Run Number (SA, MS, SD, DU)
116842-0001-SA	SOLID	8020-S		25 JAN 96-AKX	25 JAN 96-AB
116842-0002-SA	SOLID	8020-S		25 JAN 96-AKX	25 JAN 96-AB
116842-0003-MS	SOLID	8020-S		25 JAN 96-AKX	25 JAN 96-AB
116842-0003-SA	SOLID	8020-S		25 JAN 96-AKX	25 JAN 96-AB
116842-0003-SD	SOLID	8020-S		25 JAN 96-AKX	25 JAN 96-AB
116842-0004-SA	SOLID	8020-S	23 JAN 96-AK	23 JAN 96-AK	25 JAN 96-AB
116842-0005-SA	SOLID	8020-S	23 JAN 96-AK	23 JAN 96-AK	25 JAN 96-AB
116842-0006-SA	SOLID	8020M-S		26 JAN 96-AKX	26 JAN 96-AA
116842-0007-SA	SOLID	8020-S		25 JAN 96-AKX	25 JAN 96-AB
116842-0008-SA	SOLID	8020-S	23 JAN 96-AK	23 JAN 96-AK	25 JAN 96-AB
116842-0009-SA	SOLID	8020-S	23 JAN 96-AK	23 JAN 96-AK	25 JAN 96-AB
116842-0010-SA	SOLID	8020-S	23 JAN 96-AK	23 JAN 96-AK	25 JAN 96-AB
116842-0011-SA	SOLID	8020-S	24 JAN 96-AK	24 JAN 96-AK	25 JAN 96-AB
116842-0012-SA	SOLID	8020-S	24 JAN 96-AK	24 JAN 96-AK	25 JAN 96-AB
116842-0013-SA	SOLID	8020-S	24 JAN 96-AK	24 JAN 96-AK	25 JAN 96-AB
116842-0014-SA	SOLID	8020-S	24 JAN 96-AK	24 JAN 96-AK	25 JAN 96-AB
116842-0015-MS	SOLID	8020M-S		26 JAN 96-AKX	26 JAN 96-AA
116842-0015-SA	SOLID	8020M-S		26 JAN 96-AKX	26 JAN 96-AA
116842-0015-SD	SOLID	8020M-S		26 JAN 96-AKX	26 JAN 96-AA
116842-0016-SA	SOLID	8020-S	24 JAN 96-AK	24 JAN 96-AK	25 JAN 96-AB
116842-0017-SA	SOLID	8020-S	24 JAN 96-AK	24 JAN 96-AK	25 JAN 96-AB
116842-0018-SA	SOLID	8020-S	24 JAN 96-AK	24 JAN 96-AK	25 JAN 96-AB
116842-0019-SA	SOLID	8020-S	24 JAN 96-AK	24 JAN 96-AK	25 JAN 96-AB
116842-0020-SA	SOLID	8020-S	24 JAN 96-AK	24 JAN 96-AK	25 JAN 96-AB
116842-0021-SA	SOLID	8020-S	24 JAN 96-AK	24 JAN 96-AK	25 JAN 96-AB
116842-0022-MS	SOLID	8020-S		24 JAN 96-AKX	24 JAN 96-AA
116842-0022-SA	SOLID	8020-S		24 JAN 96-AKX	24 JAN 96-AA
116842-0022-SD	SOLID	8020-S		24 JAN 96-AKX	24 JAN 96-AA
116842-0023-SA	SOLID	8020-S	24 JAN 96-AK	24 JAN 96-AK	25 JAN 96-AB
116842-0024-MS	SOLID	8020-S		25 JAN 96-AKX	25 JAN 96-AA
116842-0024-SA	SOLID	8020-S		25 JAN 96-AKX	25 JAN 96-AA
116842-0024-SD	SOLID	8020-S		25 JAN 96-AKX	25 JAN 96-AA
116842-0025-SA	SOLID	8020-S	24 JAN 96-AK	24 JAN 96-AK	25 JAN 96-AB
116842-0026-SA	SOLID	8020-S	24 JAN 96-AK	24 JAN 96-AK	25 JAN 96-AB
116842-0027-SA	SOLID	8020-S		25 JAN 96-AKX	25 JAN 96-AA
116842-0028-SA	SOLID	8020-S		25 JAN 96-AKX	25 JAN 96-AA
116842-0029-SA	SOLID	8020-S		25 JAN 96-AKX	25 JAN 96-AA
116842-0030-EB	AQUEOUS	8020-A	22 JAN 96-AK	22 JAN 96-AK	
116842-0031-TB	AQUEOUS	8020-A	22 JAN 96-AK	22 JAN 96-AK	

DUPLICATE CONTROL SAMPLE REPORT
Volatile Organics by GC
Project: 116842

Category: 8020-S Aromatic Volatile Organics
Matrix: SOLID
QC Lot: 23 JAN 96-AK
Concentration Units: ug/kg

Date Analyzed: 23 JAN 96

Analyte	Spiked	Concentration			AVG	Accuracy		Precision	
		DCS1	Qual	DCS2	Qual	DCS	Limits	DCS	Limit
								(RPD)	
Benzene	10.0	7.72		8.68	8.20	82	46-129	12	20
Toluene	10.0	8.18		9.17	8.67	87	53-130	11	20
Ethylbenzene	10.0	8.08		9.04	8.56	86	51-132	11	20
Xylenes (total)	30.0	23.4		26.3	24.9	83	42-129	12	30

Category: 8020-S Aromatic Volatile Organics
Matrix: SOLID
QC Lot: 24 JAN 96-AK
Concentration Units: ug/kg

Date Analyzed:

Analyte	Spiked	Concentration			AVG	Accuracy		Precision	
		DCS1	Qual	DCS2	Qual	DCS	Limits	DCS	Limit
								(RPD)	
Benzene	10.0	9.35		8.96	9.16	92	46-129	4.3	20
Toluene	10.0	10.0		9.62	9.82	98	53-130	4.1	20
Ethylbenzene	10.0	9.93		9.59	9.76	98	51-132	3.5	20
Xylenes (total)	30.0	29.0		28.1	28.5	95	42-129	3.3	30

Calculations are performed before rounding to avoid round-off errors in calculated results.

DUPLICATE CONTROL SAMPLE REPORT
Volatile Organics by GC
Project: 116842

Category: 8020-A Aromatic Volatile Organics
Matrix: AQUEOUS
QC Lot: 22 JAN 96-AK
Concentration Units: ug/L

Date Analyzed: 22 JAN 96

Analyte	Spiked	Concentration			Accuracy		Precision	
		Measured		AVG	Average(%)		(RPD)	
		DCS1 Qual	DCS2 Qual		DCS	Limits	DCS	Limit
Benzene	10.0	7.41	8.55	7.98	80	35-143	14	28
Toluene	10.0	7.86	9.15	8.50	85	50-142	15	37
Ethylbenzene	10.0	7.82	8.77	8.29	83	53-135	11	36
Xylenes (total)	30.0	23.6	25.8	24.7	82	40-137	8.9	30

Calculations are performed before rounding to avoid round-off errors in calculated results.



Environmental
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LABORATORY CONTROL SAMPLE REPORT
Volatile Organics by GC
Project: 116842

Category: 8020-S Aromatic Volatile Organics

Matrix: SOLID

Date Analyzed: 25 JAN 96

QC Run: 25 JAN 96-AKX

Concentration Units: ug/kg

Analyte	Concentration		Accuracy(%)	
	Spiked	Measured	LCS	Limits
Benzene	10.0	8.17	82	46-129
Toluene	10.0	8.50	85	53-130
Ethylbenzene	10.0	8.30	83	51-132
Xylenes (total)	30.0	23.8	79	42-129

Category: 8020-S Aromatic Volatile Organics

Matrix: SOLID

Date Analyzed: 24 JAN 96

QC Run: 24 JAN 96-AKX

Concentration Units: ug/kg

Analyte	Concentration		Accuracy(%)	
	Spiked	Measured	LCS	Limits
Benzene	10.0	9.35	94	46-129
Toluene	10.0	10.0	100	53-130
Ethylbenzene	10.0	9.93	99	51-132
Xylenes (total)	30.0	29.0	97	42-129

Category: 8020M-S Mid-Level, Aromatic Volatile Organics Solid

Matrix: SOLID

Date Analyzed: 26 JAN 96

QC Run: 26 JAN 96-AKX

Concentration Units: ug/kg

Analyte	Concentration		Accuracy(%)	
	Spiked	Measured	LCS	Limits
Benzene	500	456	91	33-134
Toluene	500	482	96	45-131
Ethylbenzene	500	473	95	43-139
Xylenes (total)	1500	1360	91	39-131

Calculations are performed before rounding to avoid round-off errors in calculated results.

MATRIX SPIKE/MATRIX SPIKE DUPLICATE QC REPORT
Volatile Organics by GC
Project: 116842

Category: 8020-S Aromatic Volatile Organics
Matrix: SOLID
Sample: 116842-0003
MS Run: 25 JAN 96-AB
Units ug/kg Units Qualifier: Wet weight

Analyte	Sample Result	Concentration		Amount Spiked MS/MSD	%Recovery		%RPD	Acceptance Limit	
		MS Result	MSD Result		MS	MSD		Recov.	RPD
Benzene	ND	8.34	8.63	10.0	83	86	3.4	41-128	20
Toluene	ND	8.78	9.06	10.0	88	91	3.1	39-137	20
Ethylbenzene	ND	8.33	8.65	10.0	83	86	3.7	46-127	20
Xylenes (total)	ND	24.2	24.9	30.0	81	83	2.9	38-124	30

Category: 8020-S Aromatic Volatile Organics
Matrix: SOLID
Sample: 116842-0024
MS Run: 25 JAN 96-AA
Units ug/kg Units Qualifier: Wet weight

Analyte	Sample Result	Concentration		Amount Spiked MS/MSD	%Recovery		%RPD	Acceptance Limit	
		MS Result	MSD Result		MS	MSD		Recov.	RPD
Benzene	ND	8.40	8.35	10.0	84	83	0.6	41-128	20
Toluene	ND	8.80	8.73	10.0	88	87	0.8	39-137	20
Ethylbenzene	ND	8.56	8.45	10.0	86	85	1.3	46-127	20
Xylenes (total)	ND	24.5	24.5	30.0	82	82	0.2	38-124	30

Category: 8020-S Aromatic Volatile Organics
Matrix: SOLID
Sample: 116842-0003
MS Run: 25 JAN 96-AB
Units ug/kg Units Qualifier: Wet weight

Analyte	Sample Result	Concentration		Amount Spiked MS/MSD	%Recovery		%RPD	Acceptance Limit	
		MS Result	MSD Result		MS	MSD		Recov.	RPD
Benzene	ND	8.34	8.63	10.0	83	86	3.4	41-128	20
Toluene	ND	8.78	9.06	10.0	88	91	3.1	39-137	20
Ethylbenzene	ND	8.33	8.65	10.0	83	86	3.7	46-127	20
Xylenes (total)	ND	24.2	24.9	30.0	81	83	2.9	38-124	30

ND = Not Detected

Calculations are performed before rounding to avoid round-off errors in calculated results.

MATRIX SPIKE/MATRIX SPIKE DUPLICATE QC REPORT
Volatile Organics by GC
Project: 116842 (cont.)

Category: 8020-S Aromatic Volatile Organics
Matrix: SOLID
Sample: 116842-0003
MS Run: 25 JAN 96-AB
Units ug/kg Units Qualifier: Wet weight

Analyte	Sample Result	Concentration		Amount Spiked MS/MSD	%Recovery		%RPD	Acceptance Limit	
		MS Result	MSD Result		MS	MSD		Recov.	RPD
Benzene	ND	8.34	8.63	10.0	83	86	3.4	41-128	20
Toluene	ND	8.78	9.06	10.0	88	91	3.1	39-137	20
Ethylbenzene	ND	8.33	8.65	10.0	83	86	3.7	46-127	20
Xylenes (total)	ND	24.2	24.9	30.0	81	83	2.9	38-124	30

Category: 8020-S Aromatic Volatile Organics
Matrix: SOLID
Sample: 116842-0022
MS Run: 24 JAN 96-AA
Units ug/kg Units Qualifier: Wet weight

Analyte	Sample Result	Concentration		Amount Spiked MS/MSD	%Recovery		%RPD	Acceptance Limit	
		MS Result	MSD Result		MS	MSD		Recov.	RPD
Benzene	ND	9.29	5.84	10.0	93	58	46	41-128	20
Toluene	ND	9.59	5.93	10.0	96	59	47	39-137	20
Ethylbenzene	ND	9.30	6.00	10.0	93	60	43	46-127	20
Xylenes (total)	ND	26.9	16.5	30.0	90	55	48	38-124	30

Category: 8020M-S Mid-Level, Aromatic Volatile Organics Solid
Matrix: SOLID
Sample: 116842-0015
MS Run: 26 JAN 96-AA
Units ug/kg Units Qualifier: Wet weight

Analyte	Sample Result	Concentration		Amount Spiked MS/MSD	%Recovery		%RPD	Acceptance Limit	
		MS Result	MSD Result		MS	MSD		Recov.	RPD
Benzene	ND	429	417	500	86	83	2.8	21-135	26
Toluene	ND	436	435	500	87	87	0.2	30-130	34
Ethylbenzene	ND	414	416	500	83	83	0.4	36-126	33
Xylenes (total)	ND	1220	1240	1500	81	83	2.1	25-122	39

ND = Not Detected

Calculations are performed before rounding to avoid round-off errors in calculated results.

SINGLE CONTROL SAMPLE REPORT
Volatile Organics by GC
Project: 116842

Category: 8020-S Aromatic Volatile Organics
Matrix: SOLID
QC Run: 25 JAN 96-AKX
Concentration Units: ug/kg

Date Analyzed: 25 JAN 96

Analyte	Concentration		Accuracy(%)	
	Spiked	Measured	SCS	Limits
Bromofluorobenzene	20.0	14.6	73	30-137

Category: 8020-S Aromatic Volatile Organics
Matrix: SOLID
QC Run: 23 JAN 96-AK
Concentration Units: ug/kg

Date Analyzed: 23 JAN 96

Analyte	Concentration		Accuracy(%)	
	Spiked	Measured	SCS	Limits
Bromofluorobenzene	20.0	18.2	91	30-137

Category: 8020-S Aromatic Volatile Organics
Matrix: SOLID
QC Run: 24 JAN 96-AK
Concentration Units: ug/kg

Date Analyzed: 24 JAN 96

Analyte	Concentration		Accuracy(%)	
	Spiked	Measured	SCS	Limits
Bromofluorobenzene	20.0	19.5	98	30-137

Category: 8020-S Aromatic Volatile Organics
Matrix: SOLID
QC Run: 24 JAN 96-AKX
Concentration Units: ug/kg

Date Analyzed: 24 JAN 96

Analyte	Concentration		Accuracy(%)	
	Spiked	Measured	SCS	Limits
Bromofluorobenzene	20.0	19.5	98	30-137

Calculations are performed before rounding to avoid round-off errors in calculated results.

SINGLE CONTROL SAMPLE REPORT
Volatile Organics by GC
Project: 116842 (cont.)

Category: 8020M-S Mid-Level, Aromatic Volatile Organics Soild
Matrix: SOLID
QC Run: 26 JAN 96-AKX
Concentration Units: ug/kg

Date Analyzed: 26 JAN 96

Analyte	Concentration		Accuracy(%)	
	Spiked	Measured	SCS	Limits
Bromofluorobenzene	1000	820	82	28-139

Category: 8020-A Aromatic Volatile Organics
Matrix: AQUEOUS
QC Run: 22 JAN 96-AK
Concentration Units: ug/L

Date Analyzed: 22 JAN 96

Analyte	Concentration		Accuracy(%)	
	Spiked	Measured	SCS	Limits
Bromofluorobenzene	20.0	15.4	77	29-137

Calculations are performed before rounding to avoid round-off errors in calculated results.

METHOD BLANK REPORT
Volatile Organics by GC
Project: 116842

Method 8020 - Benzene, Toluene, Ethyl Benzene and Xylenes
(BTEX)

Test: 8020-BTXE-S
Matrix: SOLID
QC Run: 23 JAN 96-AK

Date Analyzed: 23 JAN 96
Reporting
Limit

Analyte	Result	Units
Benzene	ND	ug/kg
Toluene	ND	ug/kg
Ethylbenzene	ND	ug/kg
Xylenes (total)	ND	ug/kg

1.0
5.0
5.0
5.0

QC Run: 25 JAN 96-AKX

Date Analyzed: 25 JAN 96
Reporting
Limit

Analyte	Result	Units
Benzene	ND	ug/kg
Toluene	ND	ug/kg
Ethylbenzene	ND	ug/kg
Xylenes (total)	ND	ug/kg

1.0
5.0
5.0
5.0

QC Run: 24 JAN 96-AK

Date Analyzed: 24 JAN 96
Reporting
Limit

Analyte	Result	Units
Benzene	ND	ug/kg
Toluene	ND	ug/kg
Ethylbenzene	ND	ug/kg
Xylenes (total)	ND	ug/kg

1.0
5.0
5.0
5.0

QC Run: 24 JAN 96-AKX

Date Analyzed: 24 JAN 96
Reporting
Limit

Analyte	Result	Units
Benzene	ND	ug/kg
Toluene	ND	ug/kg
Ethylbenzene	ND	ug/kg
Xylenes (total)	ND	ug/kg

1.0
5.0
5.0
5.0

ND = Not Detected

METHOD BLANK REPORT
Volatile Organics by GC
Project: 116842

(cont.)

Method 8020 - Benzene, Toluene, Ethyl Benzene and Xylenes
(BTEX)

Test: 8020-BTXE-M-S
Matrix: SOLID
QC Run: 26 JAN 96-AKX

Date Analyzed: 26 JAN 96
Reporting
Limit

Analyte	Result	Units	Limit
Benzene	ND	ug/kg	250
Toluene	ND	ug/kg	250
Ethylbenzene	ND	ug/kg	250
Xylenes (total)	ND	ug/kg	250

Method 8020 - Benzene, Toluene, Ethylbenzene and Xylenes
(BTXE)

Test: 8020-BTXE-A
Matrix: AQUEOUS
QC Run: 22 JAN 96-AK

Date Analyzed: 22 JAN 96
Reporting
Limit

Analyte	Result	Units	Limit
Benzene	ND	ug/L	0.50
Toluene	ND	ug/L	1.0
Ethylbenzene	ND	ug/L	1.0
Xylenes (total)	ND	ug/L	1.0

ND = Not Detected

Total Extractable Petroleum Hydrocarbons
Method 8015 Modified (CADHS)



Client Name: Parsons Engineering Science
Client ID: 125CB1 (35.00,35.50,)
LAB ID: 116842-0006-SA
Matrix: SOIL
Authorized: 19 JAN 96
Instrument: GC/FID-T5

Sampled: 16 JAN 96
Prepared: 19 JAN 96
Dilution: 1.0

Received: 18 JAN 96
Analyzed: 22 JAN 96

Parameter	Result	Qualifier	RL	Units
Diesel Fuel #2	ND		15	mg/kg
Unknown extractable hydrocarbon	1500	y	15	mg/kg
Surrogate	Recovery		Acceptable Range	
Benzo(a)pyrene	78	%	50 - 150	

Percent moisture is 32%. All results and limits are reported on a dry weight basis.

y = Chromatographic profile is not consistent with pattern(s) exhibited by reference fuel standards. Quantitation of unknown hydrocarbons in sample is based on diesel fuel.

ND = Not Detected



Environmental
Services

Total Recoverable Petroleum Hydrocarbons
Method 418.1

Client Name: Parsons Engineering Science
Client ID: 125CB3 (40.50,41.00,)
LAB ID: 116842-0020-SA
Matrix: SOIL
Authorized: 19 JAN 96

Sampled: 17 JAN 96
Prepared: See Below

Received: 18 JAN 96
Analyzed: See Below

Parameter	Result	Qual	DIL	RL	Units	Method	Prep Date	Analyzed Date
TPH, Recoverable	ND		1.0	14	mg/kg	E418.1	22 JAN 96	23 JAN 96

Percent moisture is 29%.

All results and limits are reported on a dry weight basis.

ND = Not Detected

Aromatic Volatile Organics
Method 8020



Client Name: Parsons Engineering Science
Client ID: 125CB3 (45.50,46.00,)
LAB ID: 116842-0021-SA
Matrix: SOIL
Authorized: 19 JAN 96
Instrument: GC/PID-VKA

Sampled: 17 JAN 96
Prepared: 24 JAN 96
Dilution: 1.0

Received: 18 JAN 96
Analyzed: 24 JAN 96

Parameter	Result	Qualifier	RL	Units
Benzene	ND		1.1	ug/kg
Toluene	ND		5.4	ug/kg
Ethylbenzene	ND		5.4	ug/kg
Xylenes (total)	ND		5.4	ug/kg
Surrogate	Recovery		Acceptable Range	
Bromofluorobenzene	75	%	30	- 137

Percent moisture is 7.4%. All results and limits are reported on a dry weight basis.

ND = Not Detected



Environmental
Services

Total Extractable Petroleum Hydrocarbons
Method 8015 Modified (CADHS)

Client Name: Parsons Engineering Science

Client ID: 125CB3 (45.50,46.00,)

LAB ID: 116842-0021-SA

Matrix: SOIL

Sampled: 17 JAN 96

Received: 18 JAN 96

Authorized: 19 JAN 96

Prepared: 19 JAN 96

Analyzed: 23 JAN 96

Instrument: GC/FID-T5

Dilution: 1.0

Parameter	Result	Qualifier	RL	Units
Diesel Fuel #2	ND		11	mg/kg
Surrogate	Recovery		Acceptable Range	
Benzo(a)pyrene	79	%	50 - 150	

Percent moisture is 7.4%. All results and limits are reported on a dry weight basis.

ND = Not Detected



Total Recoverable Petroleum Hydrocarbons
Method 418.1

Environmental
Services

Client Name: Parsons Engineering Science
Client ID: 125CB3 (45.50,46.00,)
LAB ID: 116842-0021-SA
Matrix: SOIL
Authorized: 19 JAN 96

Sampled: 17 JAN 96
Prepared: See Below

Received: 18 JAN 96
Analyzed: See Below

Parameter	Result Qual	DIL	RL	Units	Method	Prep Date	Analyzed Date
TPH, Recoverable	ND	1.0	11	mg/kg	E418.1	22 JAN 96	23 JAN 96

Percent moisture is 7.4%. All results and limits are reported on a dry weight basis.

ND = Not Detected

Aromatic Volatile Organics
Method 8020



Client Name: Parsons Engineering Science
Client ID: 125CB4 (5.50,6.00,)
LAB ID: 116842-0022-SA
Matrix: SOIL
Authorized: 19 JAN 96
Instrument: GC/PID-VKA

Sampled: 17 JAN 96
Prepared: 24 JAN 96
Dilution: 1.0

Received: 18 JAN 96
Analyzed: 24 JAN 96

Parameter	Result	Qualifier	RL	Units
Benzene	ND		1.1	ug/kg
Toluene	ND		5.6	ug/kg
Ethylbenzene	ND		5.6	ug/kg
Xylenes (total)	ND		5.6	ug/kg
Surrogate	Recovery		Acceptable Range	
Bromofluorobenzene	88	%	30 - 137	

Percent moisture is 11%. All results and limits are reported on a dry weight basis.

ND = Not Detected



Environmental
Services

Total Extractable Petroleum Hydrocarbons
Method 8015 Modified (CADHS)

Client Name: Parsons Engineering Science
Client ID: 125CB4 (5.50,6.00,)
LAB ID: 116842-0022-SA
Matrix: SOIL
Authorized: 19 JAN 96
Instrument: GC/FID-T5

Sampled: 17 JAN 96
Prepared: 19 JAN 96
Dilution: 1.0

Received: 18 JAN 96
Analyzed: 23 JAN 96

Parameter	Result	Qualifier	RL	Units
Diesel Fuel #2	ND		11	mg/kg
Surrogate	Recovery		Acceptable Range	
Benzo(a)pyrene	82	%	50 - 150	

Percent moisture is 11%. All results and limits are reported on a dry weight basis.

ND = Not Detected



Total Recoverable Petroleum Hydrocarbons
Method 418.1

Environmental
Services

Client Name: Parsons Engineering Science
Client ID: 125CB4 (5.50,6.00,)
LAB ID: 116842-0022-SA
Matrix: SOIL
Authorized: 19 JAN 96

Sampled: 17 JAN 96
Prepared: See Below

Received: 18 JAN 96
Analyzed: See Below

Parameter	Result	Qual	DIL	RL	Units	Method	Prep Date	Analyzed Date
TPH, Recoverable	ND		1.0	11	mg/kg	E418.1	22 JAN 96	23 JAN 96

Percent moisture is 11%. All results and limits are reported on a dry weight basis.

ND = Not Detected

Aromatic Volatile Organics
Method 8020



Client Name: Parsons Engineering Science
Client ID: 125CB4 (10.50,11.00,)
LAB ID: 116842-0023-SA
Matrix: SOIL
Authorized: 19 JAN 96
Instrument: GC/PID-VKA

Sampled: 17 JAN 96
Prepared: 25 JAN 96
Dilution: 1.0

Received: 18 JAN 96
Analyzed: 25 JAN 96

Parameter	Result	Qualifier	RL	Units
Benzene	ND		1.1	ug/kg
Toluene	ND		5.7	ug/kg
Ethylbenzene	ND		5.7	ug/kg
Xylenes (total)	ND		5.7	ug/kg
Surrogate	Recovery		Acceptable Range	
Bromofluorobenzene	72	%	30 - 137	

Percent moisture is 12%. All results and limits are reported on a dry weight basis.

ND = Not Detected



Environmental
Services

Total Extractable Petroleum Hydrocarbons
Method 8015 Modified (CADHS)

Client Name: Parsons Engineering Science
Client ID: 125CB4 (10.50,11.00,)
LAB ID: 116842-0023-SA
Matrix: SOIL
Authorized: 19 JAN 96
Instrument: GC/FID-T5

Sampled: 17 JAN 96
Prepared: 19 JAN 96
Dilution: 1.0

Received: 18 JAN 96
Analyzed: 23 JAN 96

Parameter	Result	Qualifier	RL	Units
Diesel Fuel #2	ND		11	mg/kg
Surrogate	Recovery		Acceptable Range	
Benzo(a)pyrene	75	%	50 - 150	

Percent moisture is 12%.

All results and limits are reported on a dry weight basis.

ND = Not Detected



Total Recoverable Petroleum Hydrocarbons
Method 418.1

Environmental
Services

Client Name: Parsons Engineering Science
Client ID: 125CB4 (10.50,11.00,)
LAB ID: 116842-0023-SA
Matrix: SOIL
Authorized: 19 JAN 96

Sampled: 17 JAN 96
Prepared: See Below

Received: 18 JAN 96
Analyzed: See Below

Parameter	Result Qual	DIL	RL	Units	Method	Prep Date	Analyzed Date
TPH, Recoverable	ND	1.0	11	mg/kg	E418.1	22 JAN 96	23 JAN 96

Percent moisture is 12%. All results and limits are reported on a dry weight basis.

ND = Not Detected

Aromatic Volatile Organics
Method 8020

Client Name: Parsons Engineering Science
Client ID: 125CB4 (15.50,16.00,)
LAB ID: 116842-0024-SA
Matrix: SOIL
Authorized: 19 JAN 96
Instrument: GC/PID-VKA

Sampled: 17 JAN 96
Prepared: 25 JAN 96
Dilution: 1.0

Received: 18 JAN 96
Analyzed: 25 JAN 96

Parameter	Result	Qualifier	RL	Units
Benzene	ND		1.1	ug/kg
Toluene	ND		5.5	ug/kg
Ethylbenzene	ND		5.5	ug/kg
Xylenes (total)	ND		5.5	ug/kg
Surrogate	Recovery		Acceptable Range	
Bromofluorobenzene	82	%	30 - 137	

Percent moisture is 9.1%. All results and limits are reported on a dry weight basis.

ND = Not Detected



Environmental
Services

Total Extractable Petroleum Hydrocarbons
Method 8015 Modified (CADHS)

Client Name: Parsons Engineering Science
Client ID: 125CB4 (15.50,16.00,)
LAB ID: 116842-0024-SA
Matrix: SOIL
Authorized: 19 JAN 96
Instrument: GC/FID-T5

Sampled: 17 JAN 96
Prepared: 19 JAN 96
Dilution: 1.0

Received: 18 JAN 96
Analyzed: 23 JAN 96

Parameter	Result	Qualifier	RL	Units
Diesel Fuel #2	ND		11	mg/kg
Surrogate	Recovery		Acceptable Range	
Benzo(a)pyrene	84	%	50 - 150	

Percent moisture is 9.1%. All results and limits are reported on a dry weight basis.

ND = Not Detected



Total Recoverable Petroleum Hydrocarbons
Method 418.1

Environmental
Services

Client Name: Parsons Engineering Science
Client ID: 125CB4 (15.50,16.00,)
LAB ID: 116842-0024-SA
Matrix: SOIL
Authorized: 19 JAN 96

Sampled: 17 JAN 96
Prepared: See Below

Received: 18 JAN 96
Analyzed: See Below

Parameter	Result	Qual	DIL	RL	Units	Method	Prep Date	Analyzed Date
TPH, Recoverable	ND		1.0	11	mg/kg	E418.1	22 JAN 96	23 JAN 96

Percent moisture is 9.1%. All results and limits are reported on a dry weight basis.

ND = Not Detected

Aromatic Volatile Organics
Method 8020



Client Name: Parsons Engineering Science
Client ID: 125CB4 (20.50,21.00,)
LAB ID: 116842-0025-SA
Matrix: SOIL
Authorized: 19 JAN 96
Instrument: GC/PID-VKA

Sampled: 17 JAN 96
Prepared: 25 JAN 96
Dilution: 1.0

Received: 18 JAN 96
Analyzed: 25 JAN 96

Parameter	Result	Qualifier	RL	Units
Benzene	ND		1.1	ug/kg
Toluene	ND		5.5	ug/kg
Ethylbenzene	ND		5.5	ug/kg
Xylenes (total)	ND		5.5	ug/kg
Surrogate	Recovery		Acceptable Range	
Bromofluorobenzene	96	%	30 - 137	

Percent moisture is 8.8%. All results and limits are reported on a dry weight basis.

ND = Not Detected



Environmental
Services

Total Extractable Petroleum Hydrocarbons
Method 8015 Modified (CADHS)

Client Name: Parsons Engineering Science
Client ID: 125CB4 (20.50,21.00,)
LAB ID: 116842-0025-SA
Matrix: SOIL
Authorized: 19 JAN 96
Instrument: GC/FID-T5

Sampled: 17 JAN 96
Prepared: 19 JAN 96
Dilution: 1.0

Received: 18 JAN 96
Analyzed: 23 JAN 96

Parameter	Result	Qualifier	RL	Units
Diesel Fuel #2	ND		11	mg/kg
Surrogate	Recovery		Acceptable Range	
Benzo(a)pyrene	79	%	50 - 150	

Percent moisture is 8.8%. All results and limits are reported on a dry weight basis.

ND = Not Detected



Total Recoverable Petroleum Hydrocarbons
Method 418.1

Environmental
Services

Client Name: Parsons Engineering Science
Client ID: 125CB4 (20.50,21.00,)
LAB ID: 116842-0025-SA
Matrix: SOIL
Authorized: 19 JAN 96

Sampled: 17 JAN 96
Prepared: See Below

Received: 18 JAN 96
Analyzed: See Below

Parameter	Result Qual	DIL	RL	Units	Method	Prep Date	Analyzed Date
TPH, Recoverable	ND	1.0	11	mg/kg	E418.1	22 JAN 96	23 JAN 96

Percent moisture is 8.8%. All results and limits are reported on a dry weight basis.

ND = Not Detected



Environmental
Services

Aromatic Volatile Organics
Method 8020

Client Name: Parsons Engineering Science
Client ID: 125CB4 (30.50,31.00,)
LAB ID: 116842-0026-SA
Matrix: SOIL
Authorized: 19 JAN 96
Instrument: GC/PID-VKA

Sampled: 17 JAN 96
Prepared: 25 JAN 96
Dilution: 1.0

Received: 18 JAN 96
Analyzed: 25 JAN 96

Parameter	Result	Qualifier	RL	Units
Benzene	ND		1.0	ug/kg
Toluene	ND		5.2	ug/kg
Ethylbenzene	ND		5.2	ug/kg
Xylenes (total)	ND		5.2	ug/kg
Surrogate	Recovery		Acceptable Range	
Bromofluorobenzene	86	%	30 - 137	

Percent moisture is 3.4%. All results and limits are reported on a dry weight basis.

ND = Not Detected



Environmental
Services

Total Extractable Petroleum Hydrocarbons
Method 8015 Modified (CADHS)

Client Name: Parsons Engineering Science

Client ID: 125CB4 (30.50,31.00,)

LAB ID: 116842-0026-SA

Matrix: SOIL

Authorized: 19 JAN 96

Instrument: GC/FID-T5

Sampled: 17 JAN 96

Prepared: 19 JAN 96

Dilution: 1.0

Received: 18 JAN 96

Analyzed: 23 JAN 96

Parameter	Result	Qualifier	RL	Units
Diesel Fuel #2	ND		10	mg/kg
Surrogate	Recovery		Acceptable Range	
Benzo(a)pyrene	73	%	50 - 150	

Percent moisture is 3.4%. All results and limits are reported on a dry weight basis.

ND = Not Detected



Total Recoverable Petroleum Hydrocarbons
Method 418.1

Environmental
Services

Client Name: Parsons Engineering Science
Client ID: 125CB4 (30.50,31.00,)
LAB ID: 116842-0026-SA
Matrix: SOIL
Authorized: 19 JAN 96

Sampled: 17 JAN 96
Prepared: See Below

Received: 18 JAN 96
Analyzed: See Below

Parameter	Result	Qual	DIL	RL	Units	Method	Prep Date	Analyzed Date
TPH, Recoverable	ND		1.0	10	mg/kg	E418.1	22 JAN 96	23 JAN 96

Percent moisture is 3.4%. All results and limits are reported on a dry weight basis.

ND = Not Detected

Aromatic Volatile Organics
Method 8020



Client Name: Parsons Engineering Science
Client ID: 125CB4 (35.50,36.00,)
LAB ID: 116842-0027-SA
Matrix: SOIL
Authorized: 19 JAN 96
Instrument: GC/PID-VKA

Sampled: 17 JAN 96
Prepared: 25 JAN 96
Dilution: 1.0

Received: 18 JAN 96
Analyzed: 25 JAN 96

Parameter	Result	Qualifier	RL	Units
Benzene	ND		1.3	ug/kg
Toluene	ND		6.3	ug/kg
Ethylbenzene	ND		6.3	ug/kg
Xylenes (total)	ND		6.3	ug/kg
Surrogate	Recovery		Acceptable Range	
Bromofluorobenzene	66	%	30	- 137

Percent moisture is 21%. All results and limits are reported on a dry weight basis.

ND = Not Detected



Environmental
Services

Total Extractable Petroleum Hydrocarbons
Method 8015 Modified (CADHS)

Client Name: Parsons Engineering Science

Client ID: 125CB4 (35.50,36.00,)

LAB ID: 116842-0027-SA

Matrix: SOIL

Sampled: 17 JAN 96

Received: 18 JAN 96

Authorized: 19 JAN 96

Prepared: 19 JAN 96

Analyzed: 23 JAN 96

Instrument: GC/FID-T5

Dilution: 1.0

Parameter	Result	Qualifier	RL	Units
Diesel Fuel #2	ND		13	mg/kg
Surrogate	Recovery		Acceptable Range	
Benzo(a)pyrene	75	%	50 - 150	

Percent moisture is 21%.

All results and limits are reported on a dry weight basis.

ND = Not Detected



Total Recoverable Petroleum Hydrocarbons
Method 418.1

Environmental
Services

Client Name: Parsons Engineering Science
Client ID: 125CB4 (35.50,36.00,)
LAB ID: 116842-0027-SA
Matrix: SOIL
Authorized: 19 JAN 96

Sampled: 17 JAN 96
Prepared: See Below

Received: 18 JAN 96
Analyzed: See Below

Parameter	Result Qual	DIL	RL	Units	Method	Prep Date	Analyzed Date
TPH, Recoverable	ND	1.0	13	mg/kg	E418.1	22 JAN 96	23 JAN 96

Percent moisture is 21%. All results and limits are reported on a dry weight basis.
ND = Not Detected

Aromatic Volatile Organics
Method 8020



Client Name: Parsons Engineering Science
Client ID: 125CB4 (45.50,46.00,)
LAB ID: 116842-0028-SA
Matrix: SOIL
Authorized: 19 JAN 96
Instrument: GC/PID-VKA

Sampled: 17 JAN 96
Prepared: 25 JAN 96
Dilution: 1.0

Received: 18 JAN 96
Analyzed: 25 JAN 96

Parameter	Result	Qualifier	RL	Units
Benzene	ND		1.1	ug/kg
Toluene	ND		5.5	ug/kg
Ethylbenzene	ND		5.5	ug/kg
Xylenes (total)	ND		5.5	ug/kg
Surrogate	Recovery		Acceptable Range	
Bromofluorobenzene	67	%	30 - 137	

Percent moisture is 9.1%. All results and limits are reported on a dry weight basis.

ND = Not Detected



Total Extractable Petroleum Hydrocarbons
Method 8015 Modified (CADHS)

Environmental
Services

Client Name: Parsons Engineering Science
Client ID: 125CB4 (45.50,46.00,)
LAB ID: 116842-0028-SA
Matrix: SOIL
Authorized: 19 JAN 96
Instrument: GC/FID-T5

Sampled: 17 JAN 96
Prepared: 19 JAN 96
Dilution: 1.0

Received: 18 JAN 96
Analyzed: 23 JAN 96

Parameter	Result	Qualifier	RL	Units
Diesel Fuel #2	ND		11	mg/kg
Surrogate	Recovery		Acceptable Range	
Benzo(a)pyrene	82	%	50 - 150	

Percent moisture is 9.1%. All results and limits are reported on a dry weight basis.

ND = Not Detected



Total Recoverable Petroleum Hydrocarbons
Method 418.1

Environmental
Services

Client Name: Parsons Engineering Science
Client ID: 125CB4 (45.50,46.00,)
LAB ID: 116842-0028-SA
Matrix: SOIL
Authorized: 19 JAN 96

Sampled: 17 JAN 96
Prepared: See Below

Received: 18 JAN 96
Analyzed: See Below

Parameter	Result	Qual	DIL	RL	Units	Method	Prep Date	Analyzed Date
TPH, Recoverable	ND		1.0	11	mg/kg	E418.1	22 JAN 96	23 JAN 96

Percent moisture is 9.1%. All results and limits are reported on a dry weight basis.

ND = Not Detected



Environmental
Services

GENERAL INORGANICS

Client Name: Parsons Engineering Science
Client ID: 125CB5 (10.00,10.50,)
LAB ID: 116842-0029-SA
Matrix: SOIL
Authorized: 19 JAN 96

Sampled: 17 JAN 96
Prepared: See Below

Received: 18 JAN 96
Analyzed: See Below

Parameter	Result Qual	DIL	RL	Units	Method	Prep Date	Analyzed Date
Percent Water	13	1.0	0.10	%	D2216	NA	23 JAN 96

GENERAL INORGANICS

Client Name: Parsons Engineering Science
Client ID: 125CB1 (15.00,15.50,)
LAB ID: 116842-0004-SA
Matrix: SOIL
Authorized: 19 JAN 96

Sampled: 16 JAN 96
Prepared: See Below

Received: 18 JAN 96
Analyzed: See Below

Parameter	Result	Qual	DIL	RL	Units	Method	Prep Date	Analyzed Date
Percent Water	6.1		1.0	0.10	%	D2216	NA	23 JAN 96

GENERAL INORGANICS

Client Name: Parsons Engineering Science
Client ID: 125CB1 (25.00,25.50,)
LAB ID: 116842-0005-SA
Matrix: SOIL
Authorized: 19 JAN 96

Sampled: 16 JAN 96
Prepared: See Below

Received: 18 JAN 96
Analyzed: See Below

Parameter	Result	Qual	DIL	RL	Units	Method	Prep Date	Analyzed Date
Percent Water	4.1		1.0	0.10	%	D2216	NA	23 JAN 96



Environmental
Services

GENERAL INORGANICS

Client Name: Parsons Engineering Science
Client ID: 125CB1 (35.00,35.50,)
LAB ID: 116842-0006-SA
Matrix: SOIL
Authorized: 19 JAN 96

Sampled: 16 JAN 96
Prepared: See Below

Received: 18 JAN 96
Analyzed: See Below

Parameter	Result	Qual	DIL	RL	Units	Method	Prep Date	Analyzed Date
Percent Water	32		1.0	0.10	%	D2216	NA	23 JAN 96



GENERAL INORGANICS

Client Name: Parsons Engineering Science
Client ID: 125CB1 (40.00,40.50,)
LAB ID: 116842-0007-SA
Matrix: SOIL
Authorized: 19 JAN 96

Sampled: 16 JAN 96
Prepared: See Below

Received: 18 JAN 96
Analyzed: See Below

Parameter	Result	Qual	DIL	RL	Units	Method	Prep Date	Analyzed Date
Percent Water	32		1.0	0.10	%	D2216	NA	23 JAN 96



Environmental
Services

GENERAL INORGANICS

Client Name: Parsons Engineering Science
Client ID: 125CB1 (45.00,45.50,)
LAB ID: 116842-0008-SA
Matrix: SOIL
Authorized: 19 JAN 96

Sampled: 16 JAN 96
Prepared: See Below

Received: 18 JAN 96
Analyzed: See Below

Parameter	Result	Qual	DIL	RL	Units	Method	Prep Date	Analyzed Date
Percent Water	5.5		1.0	0.10	%	D2216	NA	23 JAN 96

GENERAL INORGANICS

Client Name: Parsons Engineering Science
Client ID: 125CB2 (5.00,5.50,)
LAB ID: 116842-0009-SA
Matrix: SOIL
Authorized: 19 JAN 96

Sampled: 16 JAN 96
Prepared: See Below

Received: 18 JAN 96
Analyzed: See Below

Parameter	Result	Qual	DIL	RL	Units	Method	Prep Date	Analyzed Date
Percent Water	9.6		1.0	0.10	%	D2216	NA	23 JAN 96

GENERAL INORGANICS

Client Name: Parsons Engineering Science
Client ID: 125CB2 (13.50,14.00,)
LAB ID: 116842-0010-SA
Matrix: SOIL
Authorized: 19 JAN 96

Sampled: 16 JAN 96
Prepared: See Below

Received: 18 JAN 96
Analyzed: See Below

Parameter	Result	Qual	DIL	RL	Units	Method	Prep Date	Analyzed Date
Percent Water	8.2		1.0	0.10	%	D2216	NA	23 JAN 96



Environmental
Services

GENERAL INORGANICS

Client Name: Parsons Engineering Science
Client ID: 125CB2 (16.00,16.50,)
LAB ID: 116842-0011-SA
Matrix: SOIL
Authorized: 19 JAN 96

Sampled: 16 JAN 96
Prepared: See Below

Received: 18 JAN 96
Analyzed: See Below

Parameter	Result	Qual	DIL	RL	Units	Method	Prep Date	Analyzed Date
Percent Water	8.2		1.0	0.10	%	D2216	NA	23 JAN 96



Environmental
Services

GENERAL INORGANICS

Client Name: Parsons Engineering Science
Client ID: 125CB2 (21.00,21.50,)
LAB ID: 116842-0012-SA
Matrix: SOIL
Authorized: 19 JAN 96

Sampled: 16 JAN 96
Prepared: See Below

Received: 18 JAN 96
Analyzed: See Below

Parameter	Result	Qual	DIL	RL	Units	Method	Prep Date	Analyzed Date
Percent Water	5.6		1.0	0.10	%	D2216	NA	23 JAN 96

GENERAL INORGANICS

Client Name: Parsons Engineering Science
Client ID: 125CB2 (26.00,26.50,)
LAB ID: 116842-0013-SA
Matrix: SOIL
Authorized: 19 JAN 96

Sampled: 16 JAN 96
Prepared: See Below

Received: 18 JAN 96
Analyzed: See Below

Parameter	Result	Qual	DIL	RL	Units	Method	Prep Date	Analyzed Date
Percent Water	3.7		1.0	0.10	%	D2216	NA	23 JAN 96



Environmental
Services

GENERAL INORGANICS

Client Name: Parsons Engineering Science
Client ID: 125CB2 (31.00,31.50,)
LAB ID: 116842-0014-SA
Matrix: SOIL
Authorized: 19 JAN 96

Sampled: 16 JAN 96
Prepared: See Below

Received: 18 JAN 96
Analyzed: See Below

Parameter	Result	Qual	DIL	RL	Units	Method	Prep Date	Analyzed Date
Percent Water	4.6		1.0	0.10	%	D2216	NA	23 JAN 96

GENERAL INORGANICS

Client Name: Parsons Engineering Science
Client ID: 125CB2 (36.00,36.50,)
LAB ID: 116842-0015-SA
Matrix: SOIL
Authorized: 19 JAN 96

Sampled: 16 JAN 96
Prepared: See Below

Received: 18 JAN 96
Analyzed: See Below

Parameter	Result Qual	DIL	RL	Units	Method	Prep Date	Analyzed Date
Percent Water	22	1.0	0.10	%	D2216	NA	23 JAN 96



Environmental
Services

GENERAL INORGANICS

Client Name: Parsons Engineering Science
Client ID: 125CB2 (41.00,41.50,)
LAB ID: 116842-0016-SA
Matrix: SOIL
Authorized: 19 JAN 96

Sampled: 16 JAN 96
Prepared: See Below

Received: 18 JAN 96
Analyzed: See Below

Parameter	Result	Qual	DIL	RL	Units	Method	Prep Date	Analyzed Date
Percent Water	29		1.0	0.10	%	D2216	NA	23 JAN 96



Environmental
Services

GENERAL INORGANICS

Client Name: Parsons Engineering Science
Client ID: 125CB2 (46.00,46.50,)
LAB ID: 116842-0017-SA
Matrix: SOIL
Authorized: 19 JAN 96

Sampled: 16 JAN 96
Prepared: See Below

Received: 18 JAN 96
Analyzed: See Below

Parameter	Result	Qual	DIL	RL	Units	Method	Prep Date	Analyzed Date
Percent Water	9.1		1.0	0.10	%	D2216	NA	23 JAN 96



Environmental
Services

GENERAL INORGANICS

Client Name: Parsons Engineering Science
Client ID: 125CB3 (6.00,6.50,)
LAB ID: 116842-0018-SA
Matrix: SOIL
Authorized: 19 JAN 96

Sampled: 17 JAN 96
Prepared: See Below

Received: 18 JAN 96
Analyzed: See Below

Parameter	Result	Qual	DIL	RL	Units	Method	Prep Date	Analyzed Date
Percent Water	17		1.0	0.10	%	D2216	NA	23 JAN 96

GENERAL INORGANICS

Client Name: Parsons Engineering Science
Client ID: 125CB3 (25.50,26.00,)
LAB ID: 116842-0019-SA
Matrix: SOIL
Authorized: 19 JAN 96

Sampled: 17 JAN 96
Prepared: See Below

Received: 18 JAN 96
Analyzed: See Below

Parameter	Result	Qual	DIL	RL	Units	Method	Prep Date	Analyzed Date
Percent Water	9.3		1.0	0.10	%	D2216	NA	23 JAN 96



Environmental
Services

GENERAL INORGANICS

Client Name: Parsons Engineering Science
Client ID: 125CB3 (40.50,41.00,)
LAB ID: 116842-0020-SA
Matrix: SOIL
Authorized: 19 JAN 96

Sampled: 17 JAN 96
Prepared: See Below

Received: 18 JAN 96
Analyzed: See Below

Parameter	Result	Qual	DIL	RL	Units	Method	Prep Date	Analyzed Date
Percent Water	29		1.0	0.10	%	D2216	NA	23 JAN 96